

Army forces require improved protection against a wide variety of threats on the future battlefield. The threat posed by the growing proliferation of tactical ballistic missiles (TBMs) and nuclear, chemical and biological (NBC) weapon technology has drawn the greatest attention. The Army is investing in a mix of active and passive defense systems to deal with the TBM/NBC threat. Patriot, THAAD and MEADS are the core of Army active defense systems, which will protect the force against TBMs and other airborne threats such as cruise missiles and aircraft. Passive defense centers around systems that can detect or offer passive protection against nuclear, chemical and biological agents. This includes detection systems like the NBC Reconnaissance System – Fox and the Biological Integrated Detection System (BIDS). It also includes items like the M40 series protective mask and the Advanced Integrated Collective Protection System that offer soldiers protection from dangerous airborne agents.

The Army is also concerned about the dangers posed by advanced conventional weapons and by fratricide. To counter the former, the Army is developing lighter and stronger ballistic protection for the individual soldier as part of the Soldier System program. The Army is also acquiring new vehicle mounted smoke generators to improve the capability to conceal moving forces and high value targets. To reduce fratricide the Army is pursuing two options. The Battlefield Combat Identification System (BCIS) will provide an interrogation/response system for Army weapons platforms that will allow them to accurately and instantly identify friendly forces; the digitization program for Army forces will provide pilots and vehicle commanders with total situational awareness that will allow them to locate friendly vehicles and distinguish them from hostile targets.



SCIENCE AND TECHNOLOGY	CONCEPT	DEM/VAL	EMD	PRODUCTION AND DEPLOYMENT	OPERATIONS AND SUPPORT
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Force XXI Land Warrior

Future Missile
Technology Integration

Integrated Biodetection
AID

Joint Combat
Identification ACID

Joint Countermine
ACID

Medical Research and
Development

Mine Hunter/Killer AID

Multispectral
Countermeasures

NBC Science and
Technology Program

Tactical High Energy
Laser (THEL)

Aerostat

Medium Extended Air
Defense System
(MEADS)

Joint Service Lightweight
Integrated Suit
Technology (JSLIST)

National Missile Defense
(NMD)

Theater High Altitude
Area Defense System
(THAAD)

Battlefield Combat
Identification System
(BCIS)

Biological Integrated
Detection System (BIDS)

Joint Tactical Ground
Station (JTAGS)

Remote Sensing
Chemical Agent
Detection (M21)

Sentinel

Smoke Generator (M58)

Automatic Chemical
Agent Detector/Alarm
(ACADA)

Chemical Agent Monitor
(CAM)

Nuclear, Biological, and
Chemical
Reconnaissance
(NBCRS)-Fox

Radiac

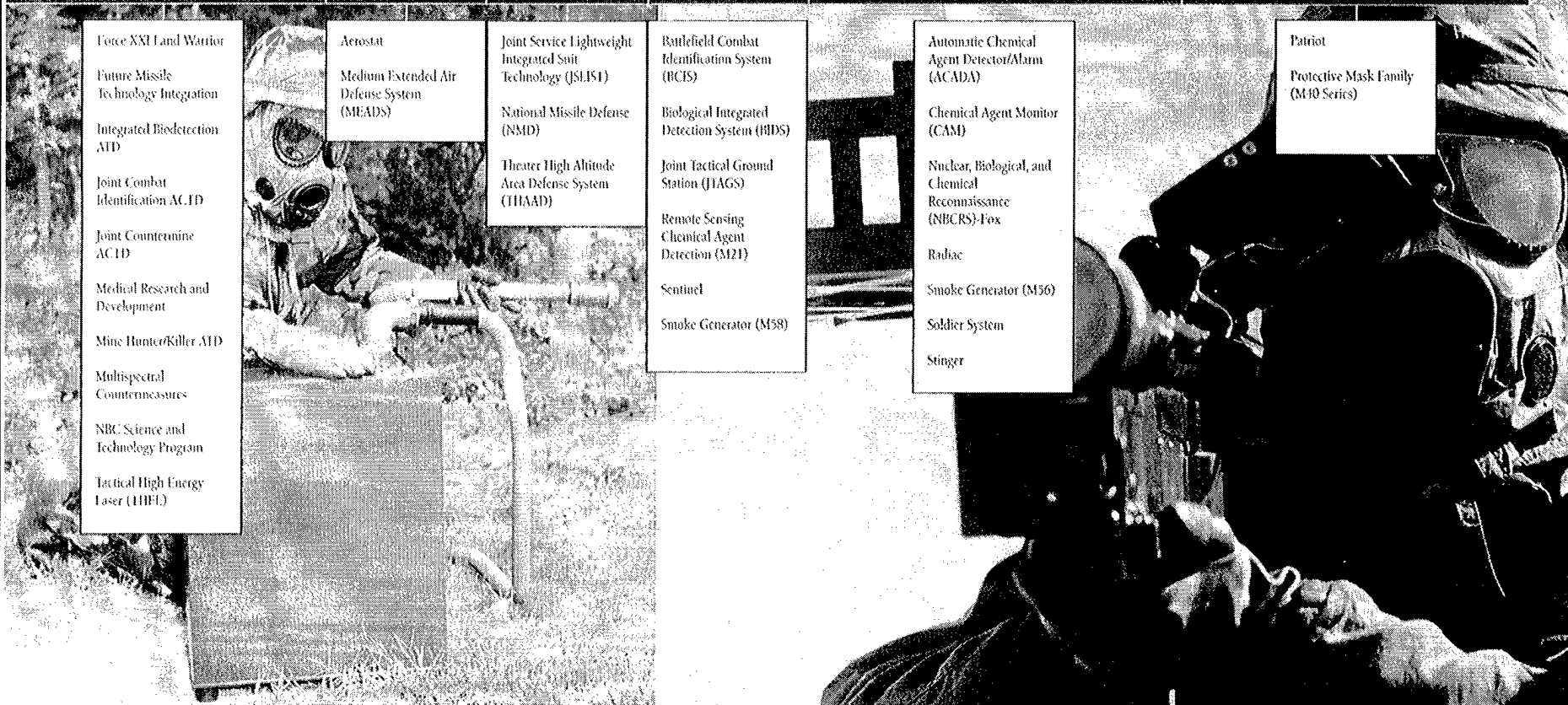
Smoke Generator (M56)

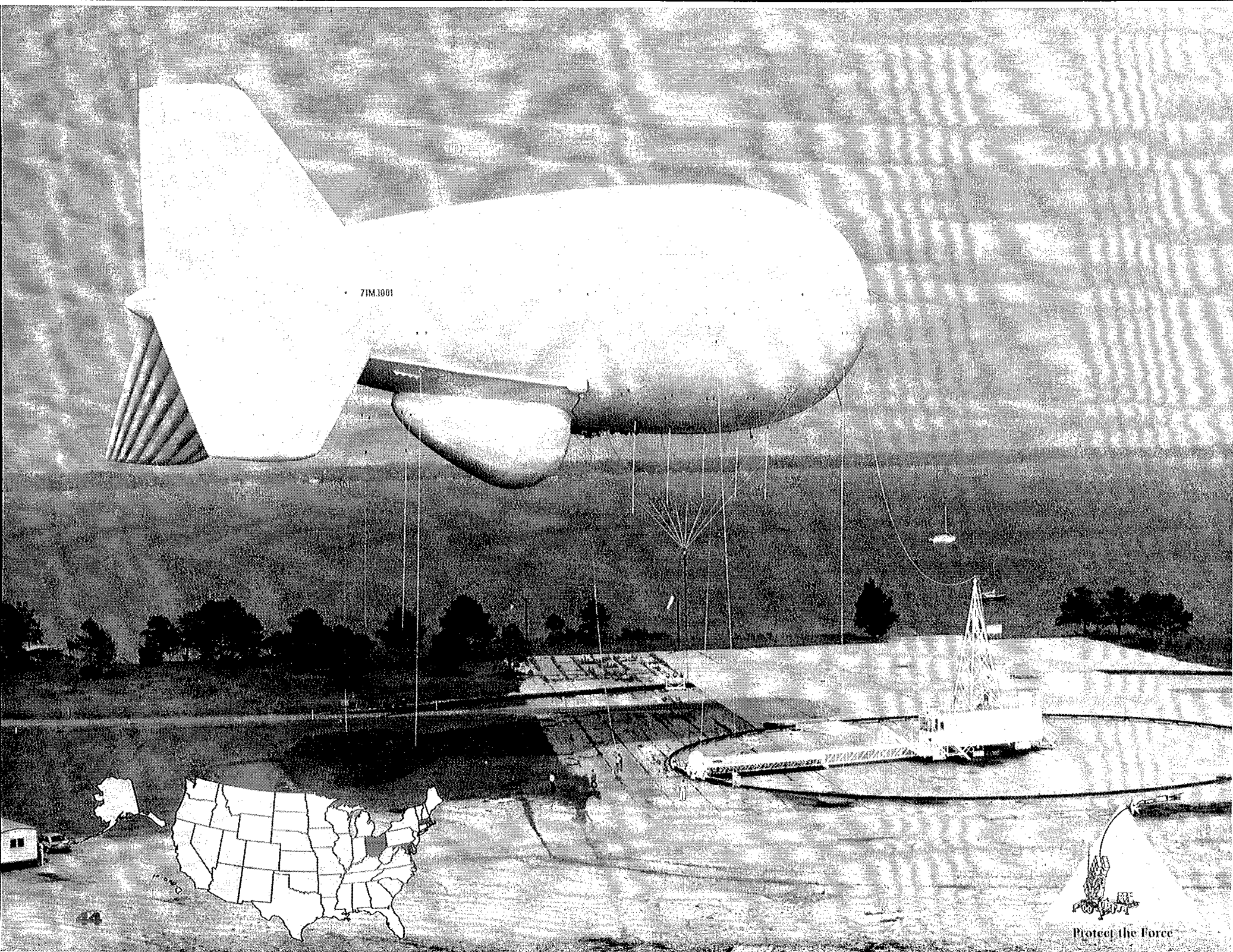
Soldier System

Stinger

Patriot

Protective Mask Family
(M40 Series)





Protect the Force

CONCEPT

MISSION: The Aerostat mission is to provide Over-the-Horizon surveillance and precision tracking data. The mission supports the air-directed surface-to-air missile concept and increases battlespace for land attack cruise missile defense (LACMD).

CHARACTERISTICS: Aerostats are theater-based systems employing advanced elevated sensors with specific application to LACMD. The aerostat system(s) will improve the battlefield commander's ability to support wide-area defense against land attack cruise missiles by expanding battlespace for weapon systems such as PATRIOT, Medium Extended Air Defense System, Aegis Standard Missile, Fighters, and Forward Area Air Defense Systems. Aerostats may also contribute to combat identification and classification.

	Small	Large
	Tactical	Strategic
Surveillance	225-280 Km	320 Km
Precision Track Illuminator	80-150 Km	100-250 Km
Combat ID	TYPE	TYPE
Altitude	10-15 K/ft	20 K/ft
BM/C4I	JTIDS/CEC	JTIDS/CEC
Basing	Land/Sea	Land/Sea
Mobility	Limited/Mobile	Limited/Mobile

FOREIGN COUNTERPART: No known foreign counterpart.

FOREIGN MILITARY SALES: No foreign military sales.

PROGRAM STATUS: On January 11, 1996, the Under Secretary of Defense (Acquisition and Technology) [USD(A&T)] and the Vice Chairman, Joint Chiefs of Staff (JCS) directed the Army to form a joint program office and initiate an Aerostat program. The Navy and Air Force plan to provide full-time deputy program managers and share in providing other required support. On 22 May 96, USD(A&T) and the Vice Chairman, JCS directed the joint Aerostat program, with Army lead, to proceed with concept studies and related risk reduction activities leading to an Advanced Concept Technology Demonstration. The Aerostat Joint Project Management Office has been established and is assigned to the U.S. Army Space and Strategic Defense Command.

PROJECTED ACTIVITIES:

- Award Small/Tactical Aerostat System Development contracts - FY97.
- Aerostat ADSAM Demonstration at Roving Sands 97 Operational Exercise.
- Risk Reduction effort with the Defense Advanced Research Projects Agency and other government agencies.

PRIME CONTRACTOR: Hughes Raytheon (Bedford, MA)
Lockheed Martin (Akron, OH)
Northrop Grumman (Baltimore, MD)

PRODUCTION AND DEPLOYMENT

MISSION: The Automatic Chemical Agent Detector Alarm-Non Developmental Item (ACADA-NDI) is an advanced point-sampling, chemical agent alarm system capable of detecting both nerve and blister agents. It will be used by Army, Navy, and Air Force units; USMC has recently expressed interest in the ACADA-NDI.

CHARACTERISTICS: The ACADA-NDI will replace the M8A1 Alarm as an automatic point detector and will augment the M1 Improved Chemical Agent (MICAD) Monitor as a survey instrument. It can automatically communicate (using MICAD) to battlefield data transfer and warning systems. It does not require a specific military operator and can be used in a fully automatic mode, communicating its warning through the MICAD system.

Weight: 24 lbs (complete w/carry case, battery pack and M42 remote alarm)

Size: 5" X 6" X 12" detector and battery box (15 lbs)

Detection Capability: nerve and blister agents

Battery life: approximately 15 hours @ 70 F

FOREIGN COUNTERPART: M90-D1 Detector

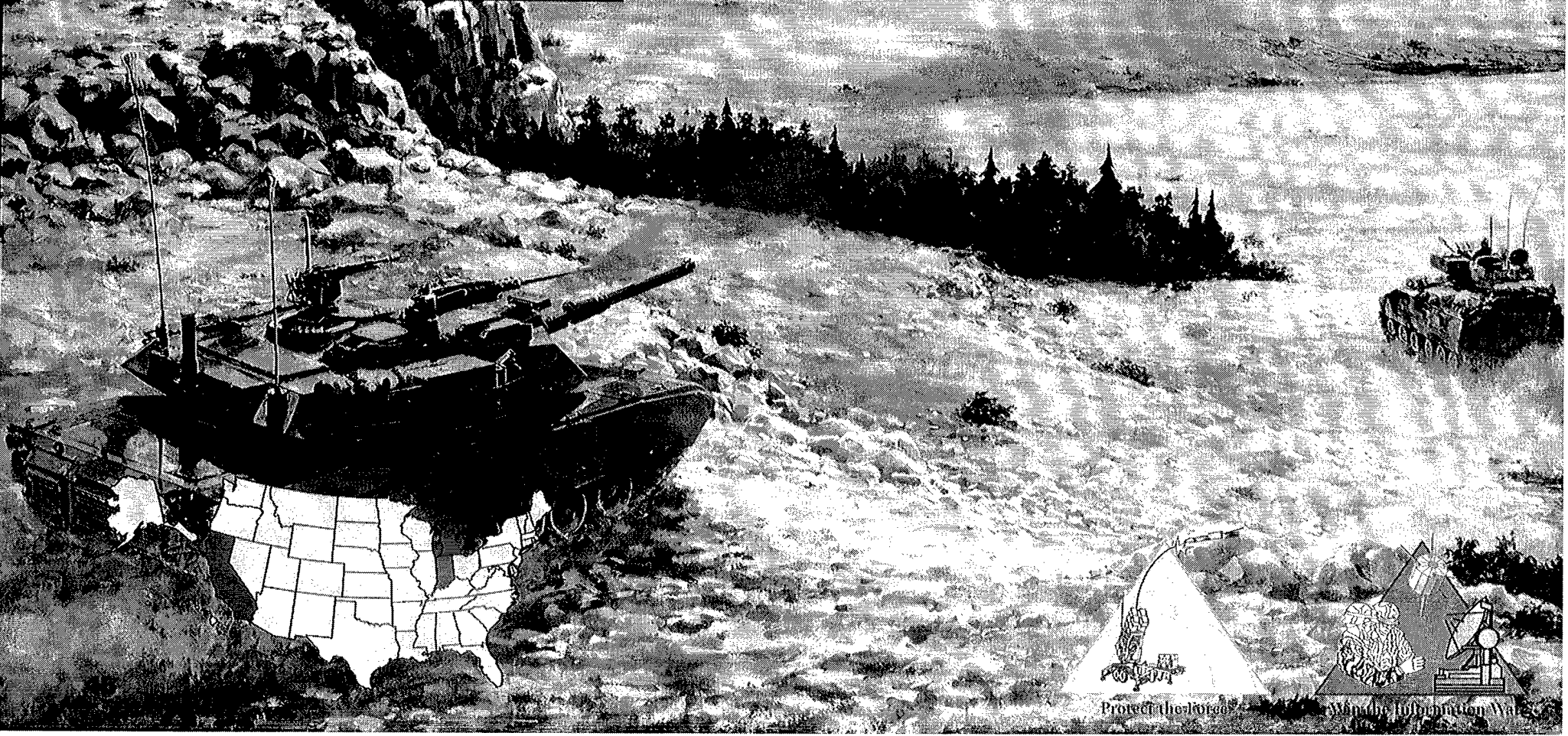
FOREIGN MILITARY SALES: No foreign military sales.

PROGRAM STATUS: Following a Production Validation Test (PVT) which consisted of operational and technical testing by the Army and Air Force, the GID-3, produced by Graseby Ionics, UK, was selected as the single NDI to proceed to type classification. A second phase of the PVT is ongoing to complete the remaining tests. At completion of a successful PVT, the GID-3 will be type classified STANDARD, meeting the requirements of the Army and Air Force.

PROJECTED ACTIVITIES: Full rate production deliveries begin - June 1997.
First Unit Equipped is USAF in 3QFY97, Army in 4QFY97.

PRIME CONTRACTOR: Graseby Dynamics LTD (UK)

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MISSION: The Battlefield Combat Identification System (BCIS) will provide the materiel solution for minimizing battlefield fratricide incidents.

CHARACTERISTICS: The BCIS is a point-of-engagement, millimeter-wave (MMW), question-and-answer type of system that will greatly reduce the risk of fratricide during military operations. The BCIS will provide positive identification of friendly ground platforms and dismounted soldiers from both ground and air weapons platforms and dismounted soldiers. The BCIS, via its digital data link capability, will provide local situational awareness of information with sufficient position resolution and timeliness to support the fire/no-fire decision at the platform level and improve combat effectiveness. Weapons platforms that have a direct fire capability and/or are instrumental in initiating indirect fire missions will transmit an interrogating MMW signal toward the suspect target. Friendly platforms will respond automatically through their transponding component with its identification as a friend. The BCIS is an integral part of the Army's digitized effort for combat identification and is one of several Horizontal Technology Initiatives. It will be used by Combat, Combat Support, and Combat Services Support units within the CONUS contingency forces.

Operating frequency range: MMW (ground-to-ground; air-to-ground) or UHF (air-to-ground)

Antenna coverage: Directional (interrogator)

Omni or 360 deg (transponder)

Range: 150 m-5,500 m (ground-to-ground)

150 m-8,000 m (air-to-ground)

Target identification time: < 1 sec

FOREIGN COUNTERPART: No known foreign counterpart.

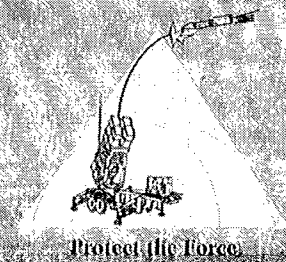
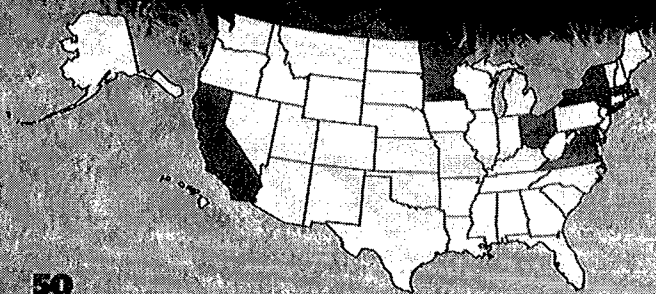
FOREIGN MILITARY SALES: No foreign military sales.

PROGRAM STATUS: The BCIS is currently in the Engineering and Manufacturing Development phase with 92 of 111 units delivered as of 3Q96. BCIS has been tested on the Abrams M1A1 and M1A2, HMMWV, FISTV, and Bradley Fighting Vehicle with demonstrated system performance which met/exceeded critical requirements. The Production Qualification Test and the Limited User Test were completed in 4Q95 and 1Q96, respectively. Sixty-two systems plus spares were installed on platforms at Ft. Hood in 3Q96 to participate in TFXXI AWE. Producibility enhancements and low cost design efforts were initiated in 4Q96.

PROJECTED ACTIVITIES: Continue Producibility Enhancement and Low-Cost Design Efforts in FY97/98.
Participate in TF XXI Advanced Warfighting Experiment 2Q97.
Participate in International Demo 3Q97.
Produce systems for Initial Operational Test and Evaluation FY98.

PRIME CONTRACTOR: Hughes (Ft. Wayne, IN)
TRW (Redondo Beach, CA)

* See appendix for list of subcontractors.



MISSION: As a corps level asset the Biological Integrated Detection System (BIDS) will mitigate the effects of large area biological warfare attacks during all phases of a campaign. The BIDS network will be used to provide the basis for warning and confirming that a biological attack has occurred. The system will provide presumptive identification and produce a safety configured sample for later laboratory analysis.

CHARACTERISTICS: The BIDS is a shelter (S-788 Lightweight Multipurpose Shelter) mounted on a dedicated vehicle (M1097 Heavy HMMWV) and equipped with a biological detection suite employing complementary technologies to detect large area biological attacks. The system is designed to allow removal of the shelter from the vehicle for fixed site applications. The system includes a trailer-mounted 15-kW generator (PU-801) to provide electrical power. The shelter includes the following equipment: (1) Collective Protection; (2) Environmental Control; (3) Sample Refrigeration; (4) HF and VHF Communication; (5) Meteorology Instrumentation and (6) Biological Detection Suite.

The BIDS biological detection suite contains multiple technologies selected to detect various characteristics of a biological aerosol attack. The BIDS integrates aerodynamic particle sizing, bioluminescence, flow cytometry, mass spectrometry and immunoassay technologies in a complementary, layered manner to increase detection confidence. The BIDS will detect and identify specific biological agents, at the following sensitivity levels and have the capability of being upgraded/modified to detect and identify other biological agents: Non Developmental Item (NDI) (Interim) BIDS - Detect 25 Agent Containing Particles per Liter of Air (ACPLA) within 15 minutes, identify 25 ACPLA within 30 minutes (45 minutes total); P3I BIDS - Detect 15 ACPLA within 10 minutes and identify 15 ACPLA within 20 minutes (30 minutes total).

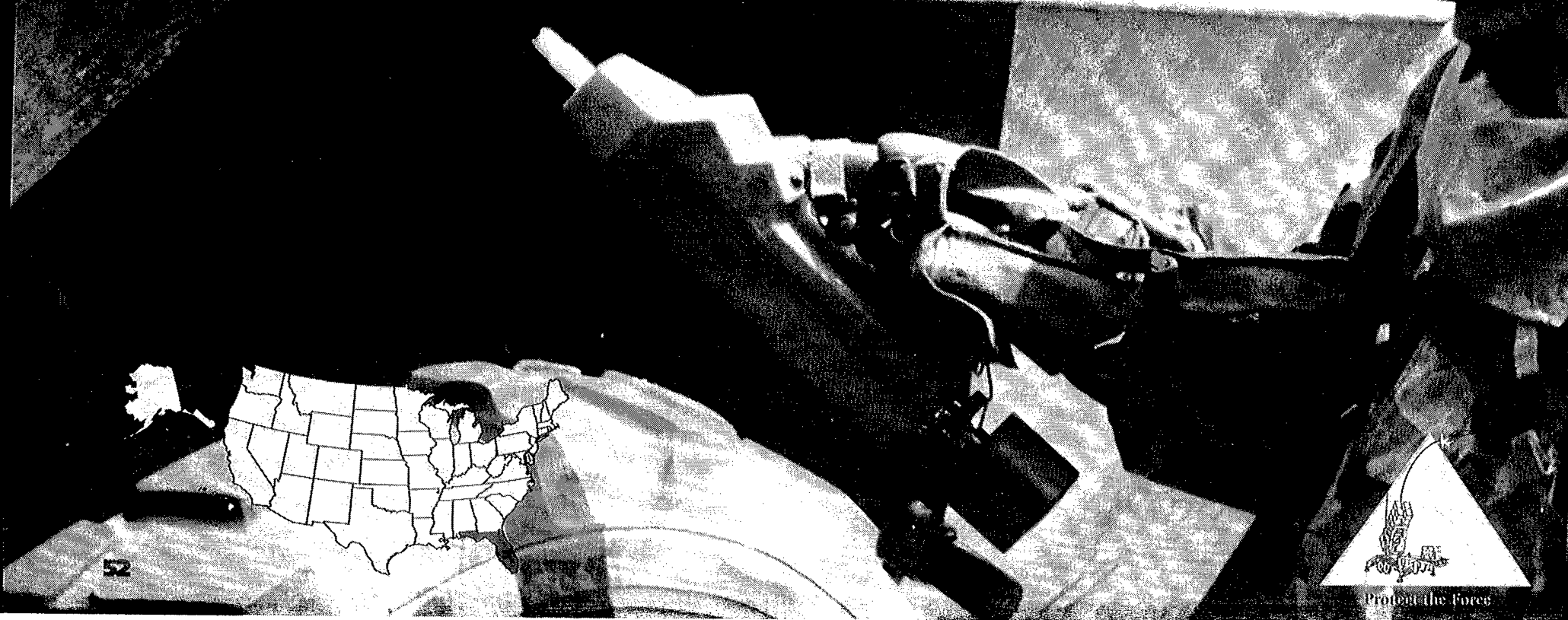
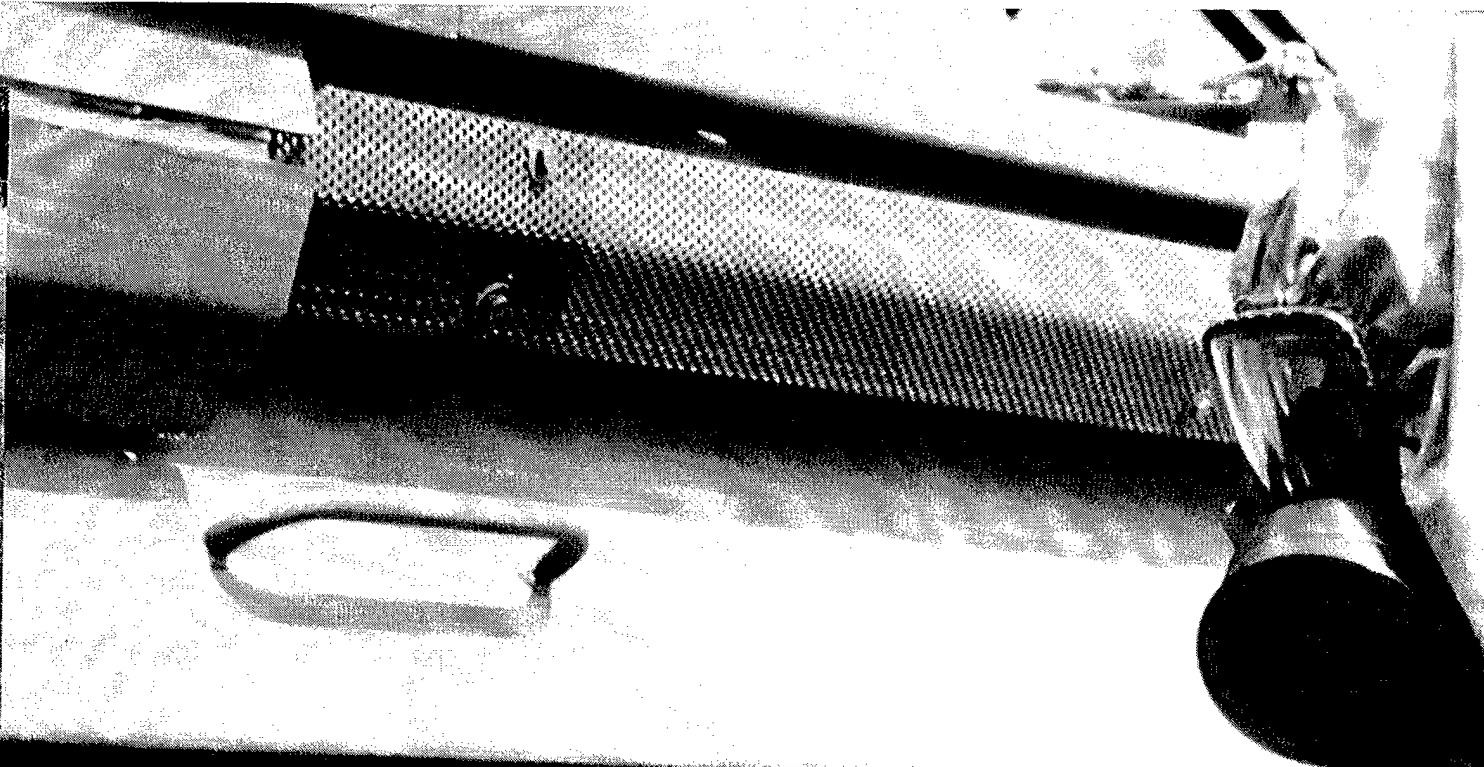
FOREIGN COUNTERPART: No know foreign counterpart.

FOREIGN MILITARY SALES: No foreign military sales.

PROGRAM STATUS: BIDS NDI has been fielded. BIDS P3I is in production.

PROJECTED ACTIVITIES: Near Term activities include: (1) Complete Production Prove-Out Test (PPT) for long lead time (LLT) P3I components (Biological Detector and Chemical Biological Mass Spectrometer); (2) Conduct a special IPR for production approval of LLT components and (3) Fabricate three P3I prototypes.

PRIME CONTRACTOR: Bruker Analytical Systems (Billerica, MA)
Environmental Technologies Group (Baltimore, MD)
Kaman Sciences Corporation (Alexandria, VA)



PRODUCTION AND DEPLOYMENT

Chemical Agent Monitor (CAM)

MISSION: The Chemical Agent Monitor (CAM) and the Improved CAM (ICAM) provide a means of quickly locating the presence of (or lack of) nerve and mustard agent contamination on personnel and equipment.

CHARACTERISTICS: The CAM is a hand-held device used to quickly find nerve and mustard agent contamination on people and equipment. It is used by troops in full protective clothing, after an attack or after going through a contaminated area. It provides fast low level detection of both nerve and mustard vapors, differentiates between nerve and mustard agents, provides an indication of the relative magnitude of the hazard present, and is not affected by most common battlefield interferences. The CAM provides information not previously available about the chemical hazard and provides it in seconds for both nerve and mustard. Use of the CAM on a chemical battlefield reduces the risk a commander may have to take in reducing the level of mission oriented protective posture in a combat situation. The CAM gives a commander the ability to quickly monitor for contamination, allowing soldiers and equipment to remain engaged in their combat missions and reduces the need for decontamination. The CAM is also used to check the effectiveness of decontamination operations on people and equipment. The ICAM differs from the CAM in that it is more reliable and much less costly to operate and repair.

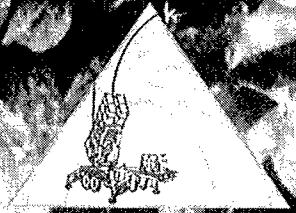
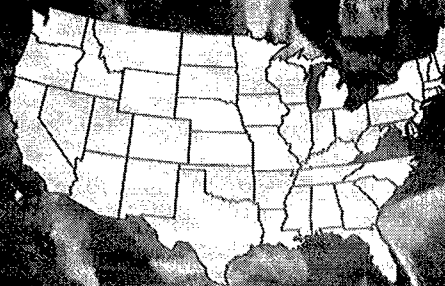
FOREIGN COUNTERPART: France: AP2C

FOREIGN MILITARY SALES: CAM is a foreign-developed item (U.K.), therefore foreign military sales are restricted by a license agreement. Sales are allowed under Foreign Military Credits. Egypt has procured 6 CAMs for their Wadimobile and is considering a significantly larger purchase.

PROGRAM STATUS: Production of 9,634 CAMs for the Army is complete and more than 9,300 fielded. A multi-year contract was awarded to Intellitec in December 1995 for a quantity of 3,135 ICAMs and associated spares. Delivery is scheduled to begin September 1998, following an extensive production acceptance test.

PROJECTED ACTIVITIES: Conduct a pre-production evaluation of the technical data package followed by production acceptance testing from May through September 1997.

PRIME CONTRACTOR: Intellitec Division (Technical Products Group) (DeLand Florida)



SCIENCE AND TECHNOLOGY	CONCEPT	EMD	PRODUCTION AND DEPLOYMENT	OPERATIONS AND SUPPORT
	DEM/VAL			

MISSION: The Joint Service Lightweight Integrated Suit Technology (JSLIST) program provides a Joint Service Chemical Biological (CB) protective clothing ensemble that can be tailored to the diverse operational needs of the individual soldier, marine, airman, and sailor and is compatible with existing and emerging individual protective equipment.

CHARACTERISTICS: The JSLIST system will consist of three major components: lightweight CB protective garments (overgarment, undergarment, duty uniform, and aviation overgarment), improved CB protective gloves, and multipurpose overboots. Each component is based on state-of-the-art material technologies that have undergone extensive user evaluation and field and laboratory testing. Through unique system and component design features, individual users can select any combination of JSLIST components to form a mission-tailored protective system. This system will provide the highest level of protection against current CB threats while reducing heat strain, weight, and bulk to an absolute minimum. User performance is optimized by balancing CB protection and heat strain management with service-defined mission requirements. Although the main thrust of JSLIST is to develop the next generation CB protective system, considerable focus also continues on ensuring full compatibility and integration with equipment such as developmental masks and body armor and developmental systems such as Land Warrior, Air Warrior, and Mounted Warrior. Under management of the four Service Program managers, JSLIST has joint participation in every aspect of the program from management, system planning, system and component design, material selection, test execution, and data assessment. The program structure and approval process have been configured to assure full user participation so that common and service unique requirements are met.

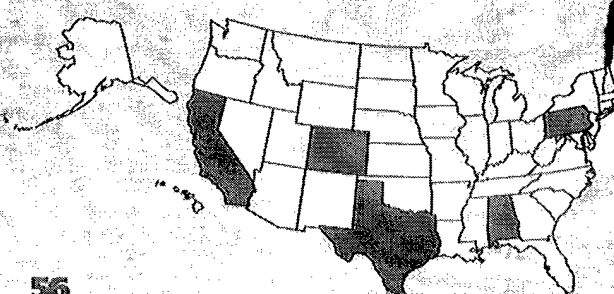
FOREIGN COUNTERPART: Multiple countries have similar products.

FOREIGN MILITARY SALES: No foreign military sales.

PROGRAM STATUS: Phase I preliminary wear tests, material tests (chemical, physical properties, and heat stress) and design of suits resulted in down selection of materials and garment designs to continue into Phase II. Phase II included extensive field DT/OT testing at diverse environmental sites and various user facilities as well as uniquely developed standardized chemical agent swatch, heat stress, aerosol, man-in stimulant system, and FR tests. A critical design review has been conducted to determine any modifications that may need to be made to ensure JSLIST system provides the best ensemble for CB protection.

PROJECTED ACTIVITIES: Based on extensive testing and preliminary evaluations, minor modification are being made to JSLIST components and additional testing is being scheduled to ensure that modifications provide desired results. An MSIII-type classification is scheduled for 2QFY97 with initial production of garments in FY97. The JSLIST P3I program will structure an iterative process that will allow for periodic technology insertion of tested approved materials into the JSLIST production cycle.

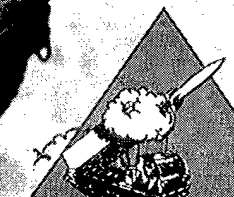
PRIME CONTRACTOR: Battelle (Stafford, VA)



Protect the Force



Win the Information War



Conduct Precision Strike

SCIENCE AND TECHNOLOGY	CONCEPT	DEM/VAL		PRODUCTION AND DEPLOYMENT	OPERATIONS AND SUPPORT
			EMD		

MISSION: The Joint Tactical Ground Station (JTACS) will receive and process data in-theater from space-based infrared sensors and disseminate warning, alerting and cueing information on TBMs and other tactical events of interest.

CHARACTERISTICS: JTACS is a theater tactical ground station contained in an 8 ft by 8 ft by 20 ft ISO shelter. The system is transportable by C-141 aircraft and can be operational within hours. For redundancy, during contingency situations, the system is deployed in pairs. It is envisioned that the system will be jointly operated during crisis situations. To reduce cost and accelerate fielding, JTACS utilizes commercial off-the-shelf hardware with minor modifications to enhance transportability and deployment options. This system is being developed to interface with major existing and planned communication systems.

FOREIGN COUNTERPART: No known foreign counterpart.

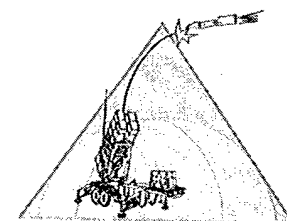
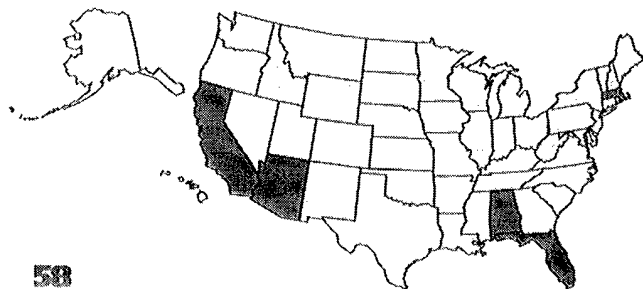
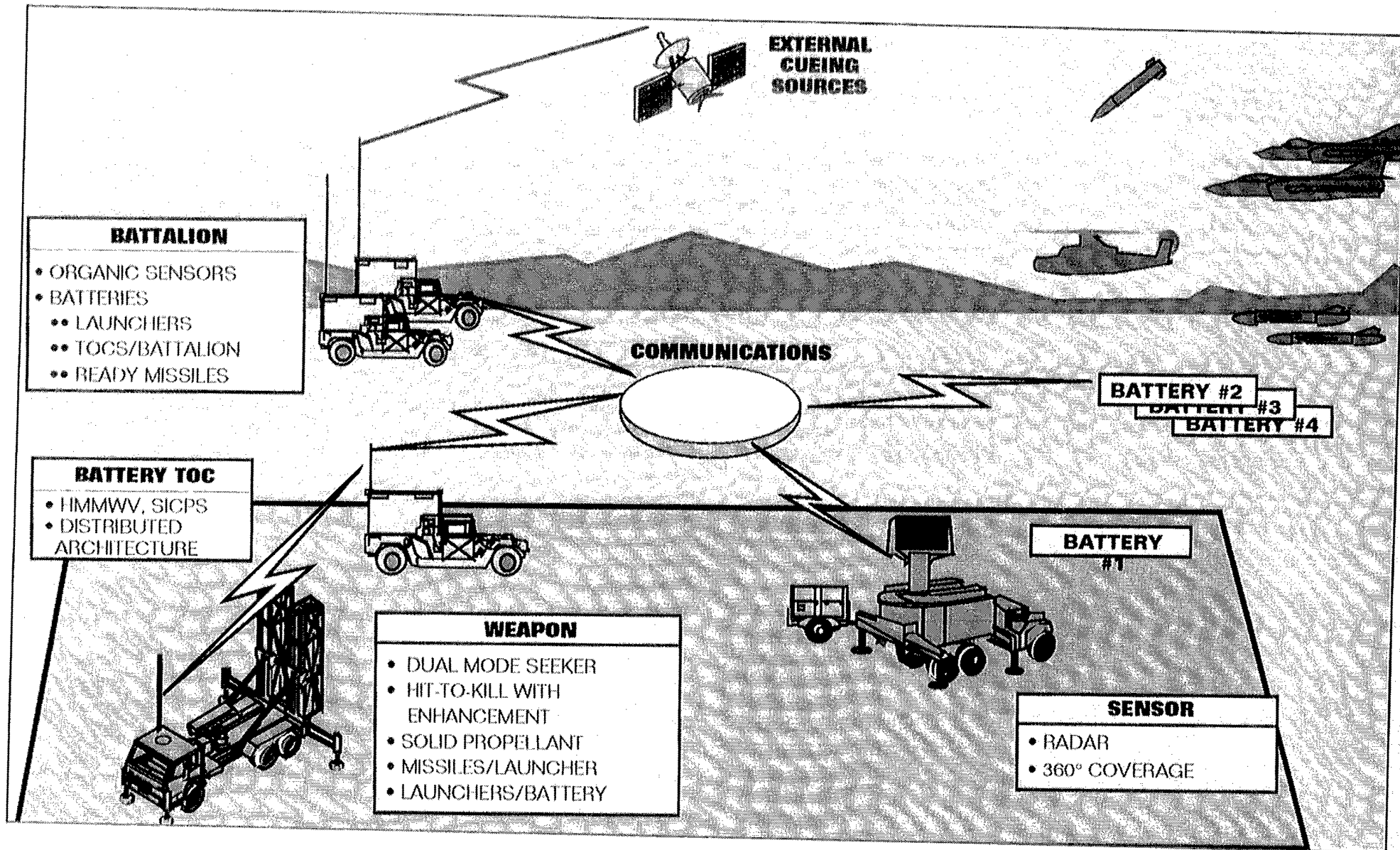
FOREIGN MILITARY SALES: No foreign military sales.

PROGRAM STATUS: JTACS is a Program Executive Office Missile Defense, ACAT III managed program, and is a joint interest effort with the Navy. The Program has transitioned from a Ballistic Missile Defense Organization/U.S. Army Space and Strategic Defense Command Advanced Technology Demonstration to an Army funded formal acquisition program. The technical feasibility of JTACS was validated by the Tactical Surveillance Demonstration proof-of-principle prototype, which was successfully tested at White Sands Missile Range. A transportable prototype was delivered during FY93 and underwent developmental and operational testing during 4QFY93 and 1QFY94. Both prototypes are currently deployed supporting EUCOM and PACOM respectively. A successful MS II IPR decision was held on 6 May 1994 which approved entry into Engineering and Manufacturing Development (EMD). The EMD contract with production options was awarded on 8 July 1994. The two EMD units were delivered 3QFY95 and underwent extensive technical and operational testing. The program was approved to enter production following a successful 26 February 1996 MS III decision review.

PROJECTED ACTIVITIES: Production units to be fielded in FY97. Phase I of a two-phased product improvement program will also begin in FY97, ending in FY99. Phase I will enhance joint communications and the system's ability to predict both the launch and impact points of tactical ballistic missiles. Phase II, scheduled from FY99-FY04, will enable JTACS to be compatible with the next generation of space-based infrared satellites. This will enable JTACS' early warning capability to remain viable well into the 21st century.

PRIME CONTRACTOR: GENCORP Inc. (Aerojet Electronic Systems) (Azusa, CA; Colorado Springs, CO)

* See appendix for list of subcontractors.



CONCEPT

MISSION: Medium Extended Air Defense System (MEADS) will provide low-to-medium air and theater missile defense to the maneuver forces and other critical forward deployed assets throughout all phase of tactical operations. It will operate both in an enclave with upper tier systems in areas of debarkation and assembly and alone or with Forward Area Air Defense System in the division area of the battlefield during movement to contact and decisive operations.

CHARACTERISTICS: MEADS will provide air and missile defense of vital corps and division assets associated with the Army and Marine Corps maneuver forces. MEADS will utilize a combination of a netted and distributed architecture, modularly configurable battle elements, interoperability with other airborne and ground based sensors, and improved seeker/sensor components to provide a robust defense against the full spectrum of TBM, cruise missile, unmanned aerial vehicle, TASM, rotary wing, and forward wing threats. MEADS will be designed to provide: 1) defense against multiple and simultaneous attacks by SRBMs, low cross-section cruise missiles, and other air-breathing threats to the force; 2) immediate deployment for early entry operations with as few as six C-141 sorties; 3) mobility to move rapidly and protect maneuver force assets during offensive operations; 4) a distributed architecture and modular components to increase survivability and flexibility of employment in a number of operational configurations; and 5) a significant increase in firepower while greatly reducing manpower and logistics requirements. Given these characteristics, MEADS can rapidly respond to a variety of crisis situations and satisfy the needs of the joint operational and tactical commanders.

FOREIGN COUNTERPART: Germany: Taktisches Luftverteidigungs System (TLVS)

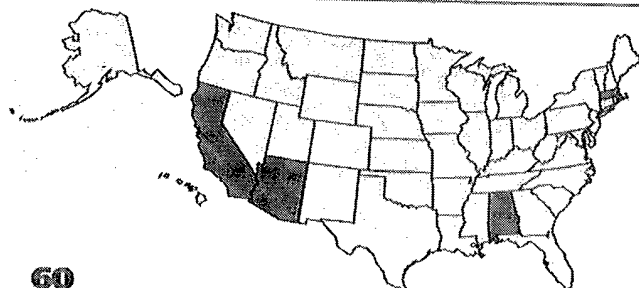
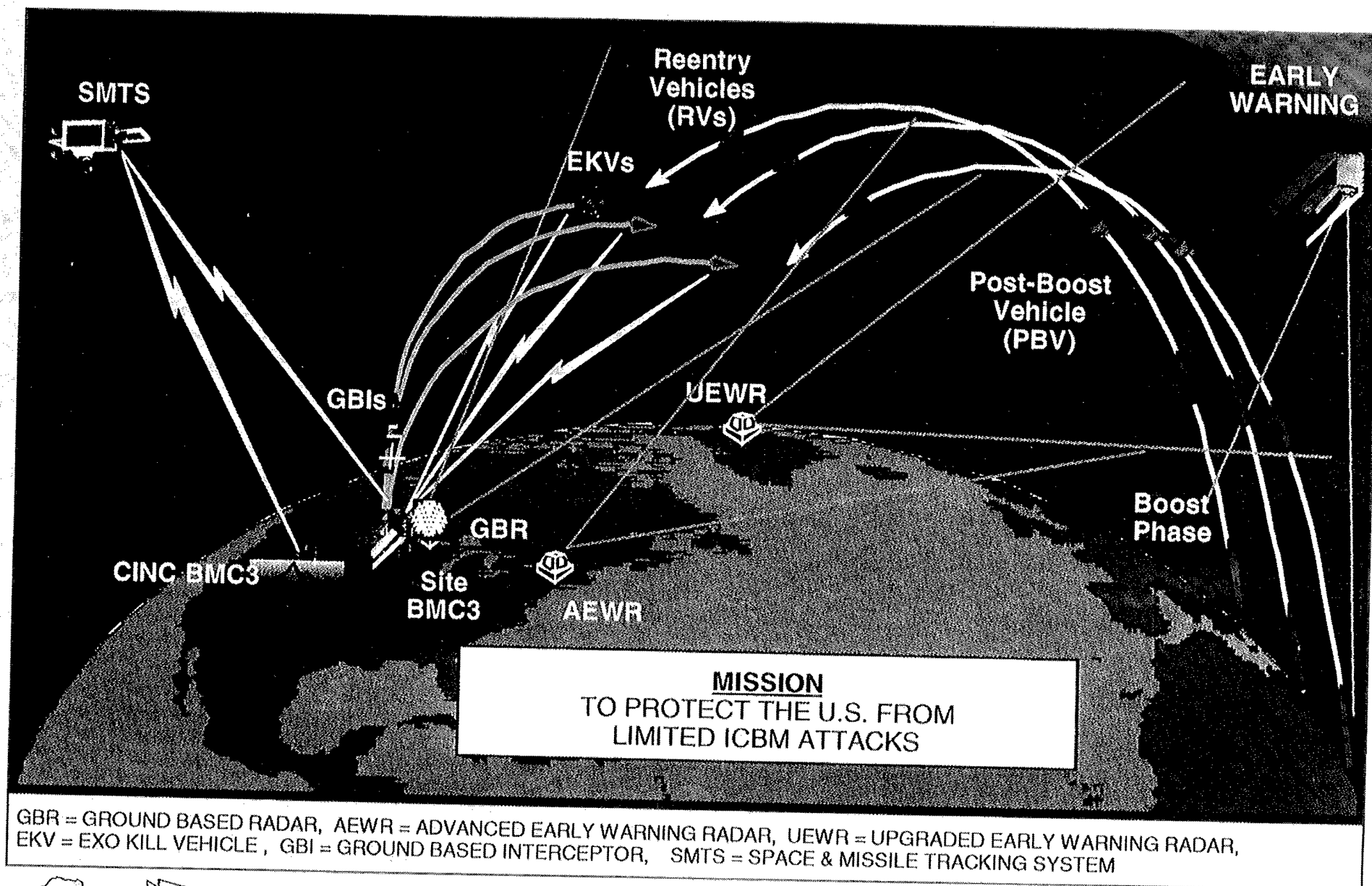
FOREIGN MILITARY SALES: No foreign military sales.

PROGRAM STATUS: Concurrent with the U. S. MEADS requirements and concepts, discussions with German (GE) government and industry confirmed similar operational/technical requirements which provided an opportunity for cooperation. Discussions were later expanded to include France (FR) and Italy (IT). On 20 Feb 95 representatives of U.S., GE, FR, and IT signed a Statement of Intent (SOI) to cooperate on the development and production of the MEADS. This cooperation was based on the U.S. providing 50% of funding and receiving 50% of the workshare. However, France later decided not to participate in the program. Thus, the U. S., GE, and IT signed a 1 May 96 Memorandum of Understanding formally initiating the program's first phase, known as Project Definition and Validation (PD-V). New cost/work share ratios are 60%/25%/15% for the U. S./GE/IT respectively. MEADS will be managed by the NATO MEADS Management Agency, a NATO-chartered agency located in Huntsville, Alabama. During PD-V, two competing international teams will define total system concepts, establish system and prime item specifications, demonstrate critical functions, develop digital end-to-end simulations, and establish integrated program plans and cost estimate for the Design and Development and Production Phases.

PROJECTED ACTIVITIES: Downselect to one international team in the late FY98-early FY99 timeframe for the Design and Development phase, currently scheduled to begin 2QFY99.

PRIME CONTRACTOR: MEADS will have two international contractor teams competing during the PD-V Phase: 1) MEADS Inc. (consortium consisting of U.S. contractor Hughes and Raytheon Co (joint venture), and European contractors Deutsch Aerospace (Germany), Siemens (Germany), and Alenia (Italy), and 2) MEADS International Inc. (consortium consisting of U.S. contractor Lockheed Martin Integrated Systems and the same three international contractors).

* See appendix for list of concept studies contractors.



DEM/VAL

MISSION: To protect the United States against limited long range ballistic missile (ICBM/SLBM) attacks.

CHARACTERISTICS: The National Missile Defense (NMD) system will interoperate with external Early Warning (EW) sensors (DSP/SBIRS and EW Radars) and the United States Space Command (USSPACECOM) Command and Control Center via CINC Battle Management Command Control and Communications (BMC3). The Army elements of the NMD System include ground-based exoatmospheric hit-to-kill interceptors, a ground-based, phased array, national defense radar (for surveillance, track, object classification and kill assessment) and site BMC3 (for human-in-control, engagement planning, top level decision making and system communications). For an effective early capability to protect all 50 states prior to SBIRS-Low availability, advanced and upgraded EW radars may be required.

An NMD engagement is initiated based on early warning sensors detecting and designating hostile ballistic missile launches toward the U.S. and transmitting the tracking data through the CINC BMC3 to the site BMC3. Using data from surveillance and tracking systems including the ground-based radar, the site BMC3 aids the operators in identifying the hostile reentry vehicles and planning the engagement. After launch and burning of the booster, a kill vehicle separates and repositions itself pointing the seeker field-of-view to the predicted target position. The on-board computer receives additional target updates from the site BMC3 based on surveillance data and executes intercept course correction maneuvers. Once uncapped, the on-board passive seeker searches and acquires the target and any associated objects in its field-of-view. The target is designated using a combination of target object map, provided by the site BMC3 based on radar and EW sensor data, and on-board target selection capabilities. After target designation, the kill vehicle tracks the target executing "end game" maneuvers to achieve a direct impact kill. The intercept is monitored by the radar and EW sensors for kill assessment or further battle management action, if required.

FOREIGN COUNTERPARTS: Russia: Moscow ABM System

FOREIGN MILITARY SALES: No foreign military sales.

PROGRAM STATUS: The NMD Program has been elevated from a technology effort to a Deployment Readiness (or 3+3) Program and has been designated as a Major Defense Acquisition Program. The Army is supporting Ballistic Missile Defense Organization in the execution of the NMD Program. The goal of the program is to develop and test the elements of the initial ground-based NMD system within the next three years that could be deployed within an additional three years, if dictated by the threat. The Army's efforts are focused on developing and demonstrating the Ground Based Interceptor, the Ground Based Radar, and the Site BM/C3. The baseline program will demonstrate the integrated performance of the initial NMD elements by the end of FY99.

PROJECTED ACTIVITIES: Two Exoatmospheric Kill Vehicle (EKV) sensor flight tests in FY97 (one per contractor); EKV down select in FY98. One EKV intercept flight test in FY98 and one in FY99. One system flight test in FY99. GBR prototypes available for integrated testing beginning in FY98.

PRIME CONTRACTOR: EKV Contractors are General Motors Corp. (Hughes Aircraft Company) and Rockwell International. The payload launch vehicle (PLV) contractor is Lockheed Martin (Lockheed Missiles and Space Company). The GBR contractor is Raytheon. The BMC3 contractor is TRW.

* See appendix for list of subcontractors.



MISSION: The Nuclear, Biological, and Chemical Reconnaissance System (NBCRS) will detect, identify, and mark areas of nuclear and chemical contamination, and report accurate information to supported commanders in real time. The NBCRS can also sample for nuclear, biological and chemical contamination.

CHARACTERISTICS: The currently fielded XM93 and, soon to be fielded, M93A1 are wheeled armored vehicles equipped with a fully integrated nuclear and chemical detection, warning, and communications capability, and the added capacity to sample nuclear, biological and chemical contamination for future analysis. These systems can collect soil, water, and vegetation samples for later analysis; mark areas of nuclear and chemical contamination; and transmit, in real time, NBC information to unit commanders in the area of operation. The hazards to the NBCRS crew are minimized through the inclusion of vehicle NBC collective protection, providing positive overpressure with heating and cooling for crewmen.

Body style: 6-wheel, armored-collective protection

Engine: V8 Diesel—320 hp

Weight: XM93: 18.7 ton; XM93E1: 20.2 ton

Speed: 65 mph

Range: 500 mi

Crew: XM93: 4 soldiers; XM93E1: 3 soldiers

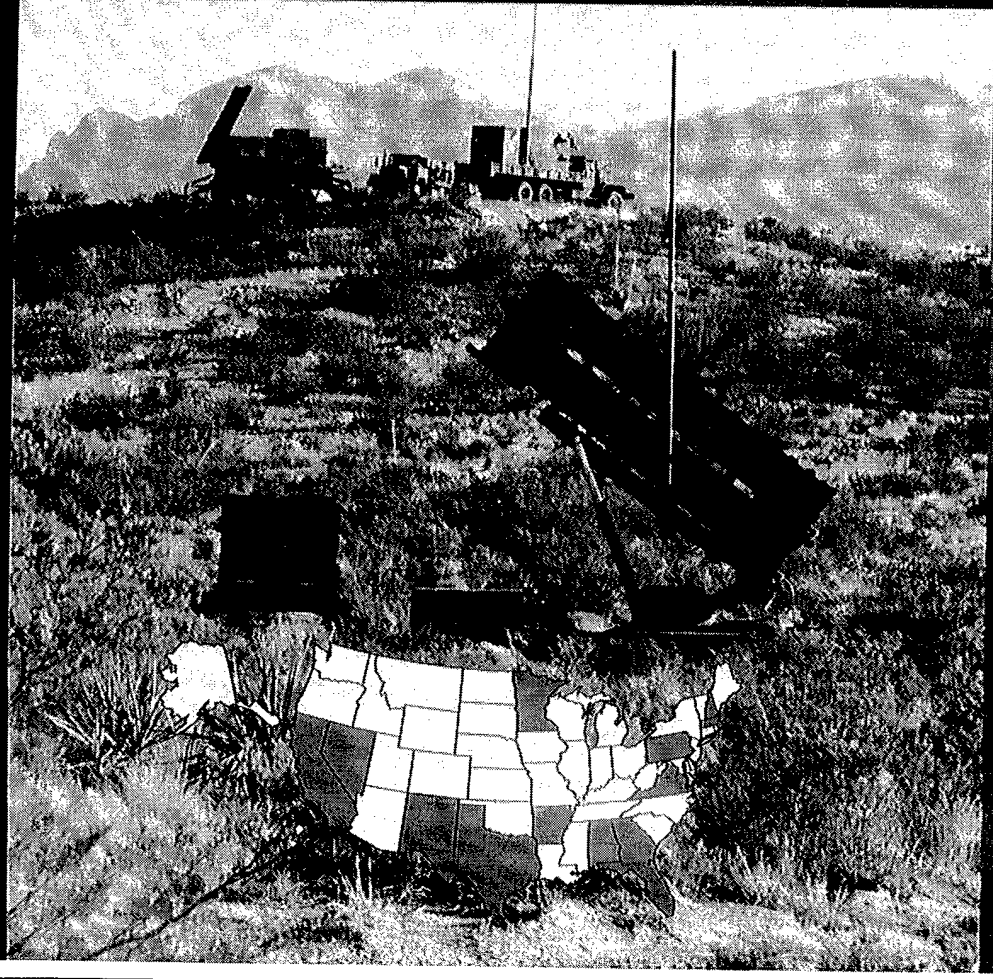
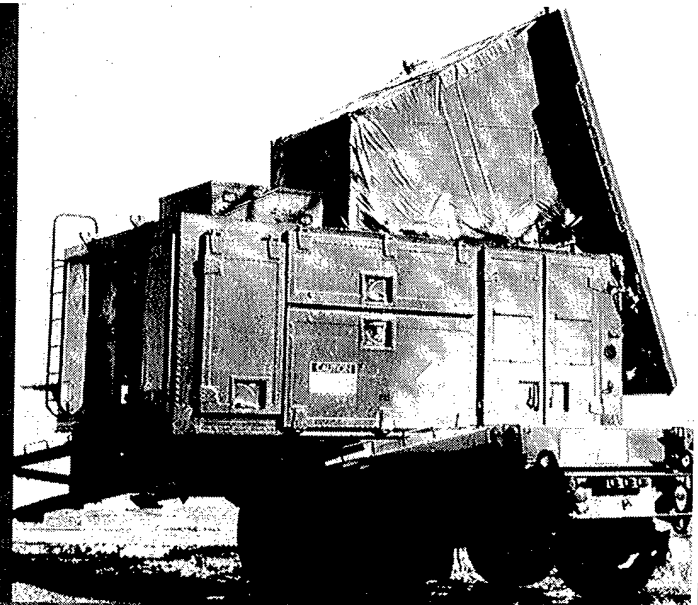
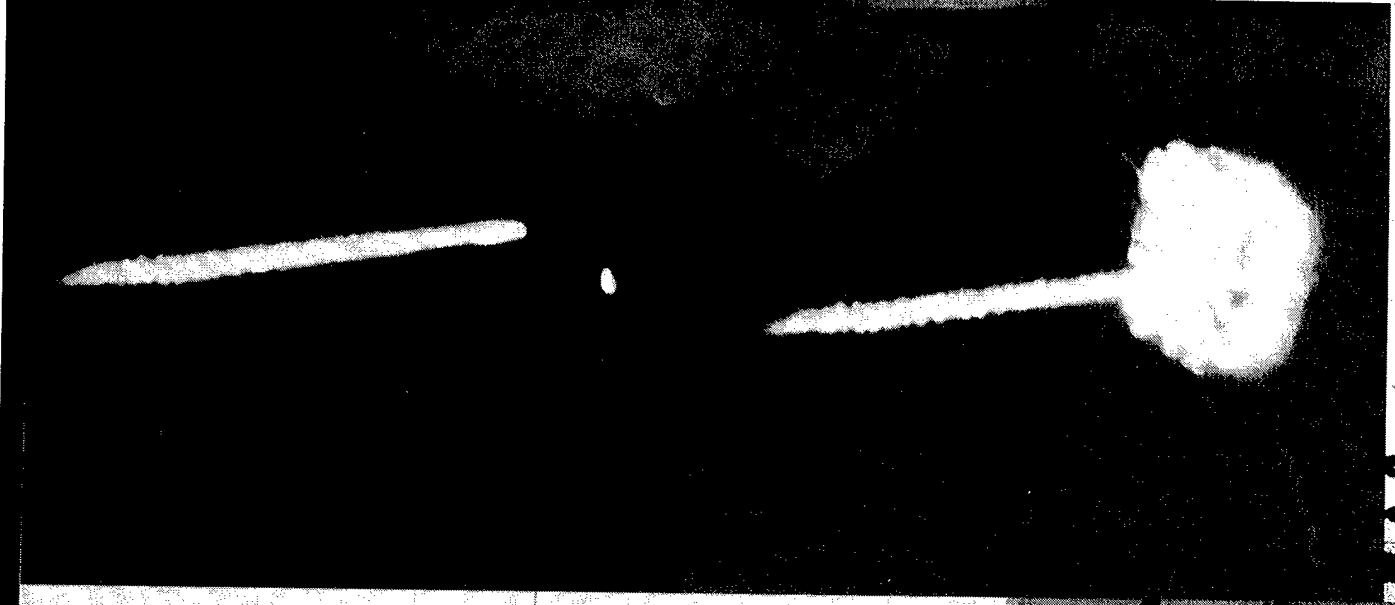
FOREIGN COUNTERPART: China has an NBC reconnaissance vehicle. Russia: BRDM-ZRKH, MTLB, RKHM, UAZ-469RKH.

FOREIGN MILITARY SALES: No foreign military sales.

PROGRAM STATUS: The NBCRS is a Non-Developmental Item program consisting of four phases: (1) Proposal Evaluation and Shoot-Off phase, during which proposals were evaluated, competition conducted, and a winner selected. General Dynamics Land Systems was selected to complete all additional phases; (2) Interim System Production phase for the XM93, which provided 48 contractor-supported systems for urgent fielding. Additionally, the German Government donated 60 German XM93 NBCRS to the U.S. Government in support of Operation Desert Storm (ODS). Following ODS, all systems were redeployed worldwide to U.S. Army and Marine Corps forces; (3) System Improvement phase to design, fabricate, and test the XM93E1 NBCRS which satisfies all Required Operational Capabilities (ROC) requirements; and (4) A Block I modification program to upgrade all XM93 NBCRSs to the M93A1 configuration.

PROJECTED ACTIVITIES: Production Qualification Testing is scheduled for September 1997.
First Unit Equipped with the new M93A1 in March 1998.

PRIME CONTRACTOR: General Dynamics (Detroit, MI)
Thyssen Henschel (Germany)



MISSION: The PATRIOT Missile System provides high- and medium-altitude defense against aircraft and tactical ballistic missiles to critical assets and maneuver forces belonging to the corps and to echelons above corps. The PATRIOT Advanced Capability-3 (PAC-3) system upgrade, along with the PAC-3 missile, will provide an advanced anti-tactical missile capability to the current fielded system.

CHARACTERISTICS: The combat element of the PATRIOT Missile System is the fire unit, which consists of a Radar Set (RS), an Engagement Control Station (ECS), an Electric Power Plant (EPP), an Antenna Mast Group (AMG), and eight remotely located Launching Stations (LS). The RS provides all tactical functions of airspace surveillance, target detection and tracking, and missile guidance. The ECS provides the human interface for command and control of operations. Currently, each launcher contains four ready-to-fire missiles, sealed in canisters which serve a dual purpose as shipping containers and launch tubes. PATRIOT's fast reaction capability, high firepower, ability to track 50 targets simultaneously, and the ability to operate in a severe electronic countermeasures environment are features not available in previous air defense systems. The PAC-3 upgrade program will incorporate significant upgrades to the RS, ECS, and will include up to 16 advanced hit-to-kill missiles into three to four of the eight launchers per firing battery, thus increasing fire power and ballistic missile defense capabilities. The primary mission of the PAC-3 missile is to kill both maneuvering and non-maneuvering tactical ballistic missiles. The PAC-3 missile will also have a capability to counter cruise missiles and aircraft.

FOREIGN COUNTERPART: Russia: SA-10 and SA-12

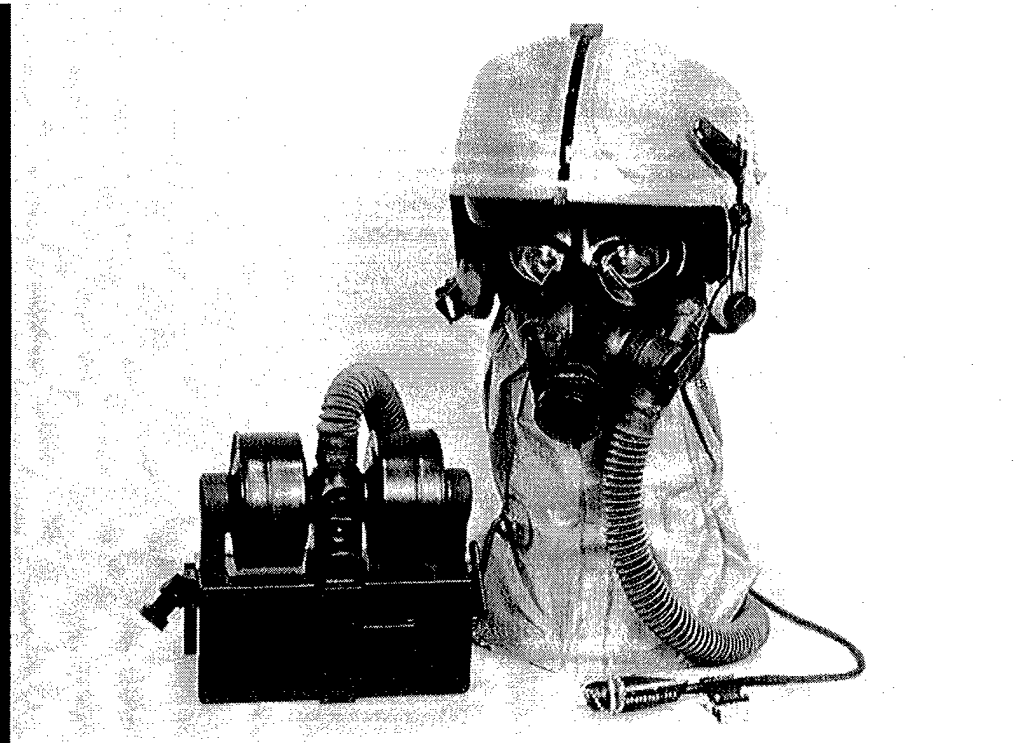
FOREIGN MILITARY SALES: Germany, Israel, Japan, Kuwait, the Netherlands, and Saudi Arabia are currently participating in PATRIOT acquisition programs. Discussions with several other interested allies for PATRIOT acquisition are ongoing.

PROGRAM STATUS: PATRIOT has completed fielding to U.S. forces and is deployed in CONUS, Europe, Korea, and Southwest Asia. U.S. missile production deliveries include PATRIOT Anti-Tactical Missile Capability-Level 2 (PAC-2), and Guidance Enhancement Missiles. The PAC-3 capability comprises system improvements that will result in a time-phased series of system hardware and software changes designed to improve performance against an evolving threat, meet user needs, and correct existing system deficiencies in a timely, affordable manner.

PROJECTED ACTIVITIES: The PAC-3 missile, a key component of overall system improvements, has entered the test flight phase of Engineering and Manufacturing Development (EMD). The Low-rate Initial Procurement (LRIP) decision for the PAC-3 missile is scheduled to occur in 3rd Quarter 1997.

PRIME CONTRACTOR: Lockheed Martin Vought Systems (Grand Prairie, TX)
Raytheon (Bedford, MA)

* See appendix for list of subcontractors.



MISSION: The family of chemical, biological and radiological protective masks (M40 Series) provides respiratory, eye, and face protection against chemical and biological agents, toxins, radioactive particles and battlefield contaminants. These masks are issued to every soldier, the M42A2 to armored crews, M45 to rotary wing crew, and the M40A1 to the balance of the force and AMC Surety Sites. The M41 Protection Assessment Test System (PATS) checks out the readiness of a protective mask while worn by an individual. It also can be used to screen for unserviceable masks and assists in training personnel on the proper wearing and fitting of the mask.

CHARACTERISTICS: The M40A1, M42A2 and M45 masks have a silicone rubber facepiece with an in-turned peripheral face seal and binocular rigid lens system. The basic mask, the M40A1, replaces all previously fielded masks. It includes a face-mounted canister with NATO standard threads (gas and aerosol filter) which can be worn on either the right or left cheek and includes a drink tube, and clear and tinted lens outserts. When the canister is attached to a connection hose and equipped with a canister harness, larger mask carrier, and a microphone, the mask becomes the M42A2 which is used by all combat vehicle crew personnel. The interchangeability has also permitted the repair of masks using a facepiece assembly, while retaining other existing, undamaged parts instead of a total replacement a significant cost and time savings. The M45 is designed with close-fitting eye lenses, and interchangeable nose cups, to permit fitting an increased range of soldiers. This unique design permits operation of aircraft sighting systems and night vision devices without the aid of forced ventilation air. The PATS now permits verification that the fit of the mask to the soldier's face is acceptable and that there are no critical leaks in the mask system.

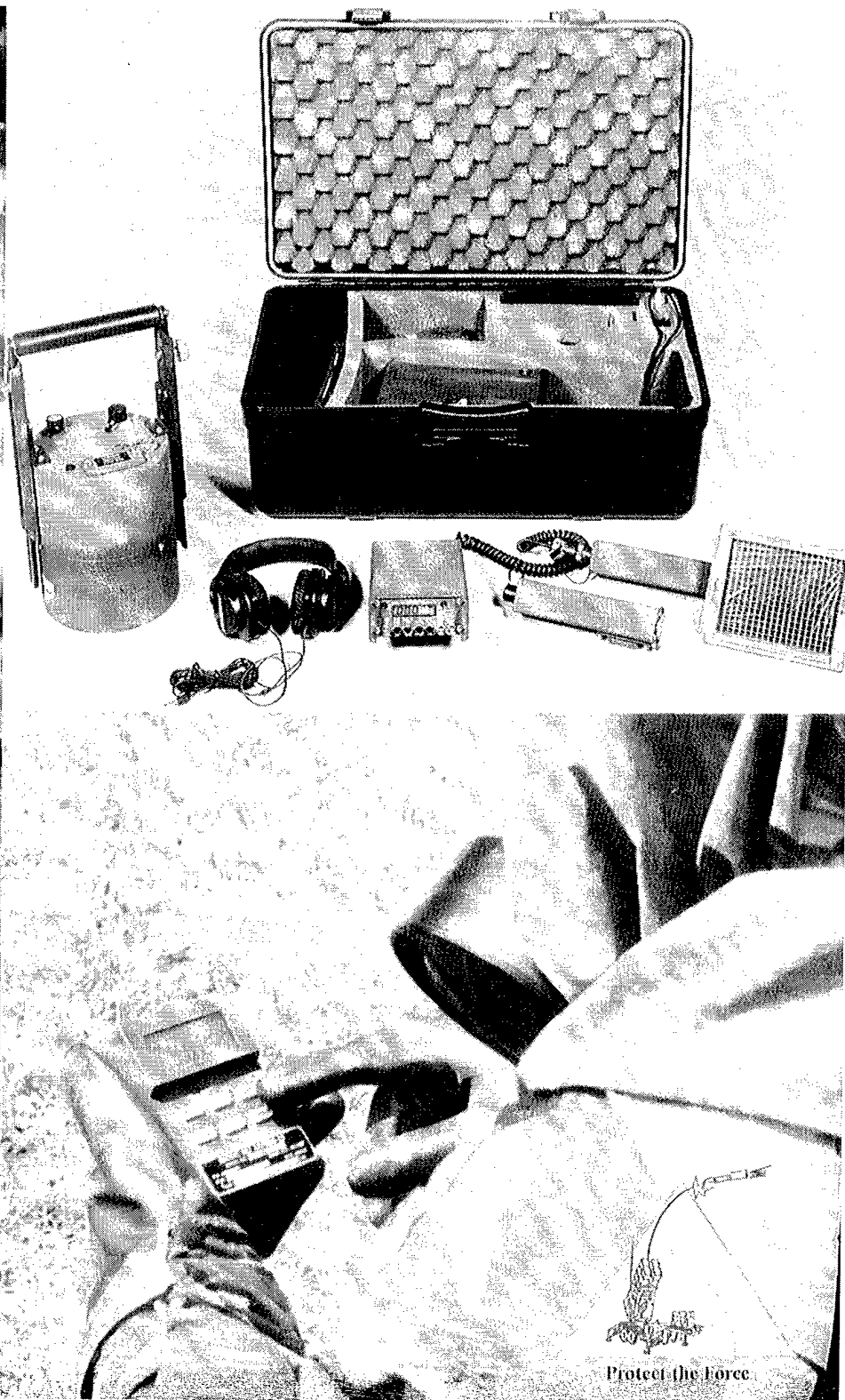
FOREIGN COUNTERPART: Britain: S10

FOREIGN MILITARY SALES: No foreign military sales.

PROGRAM STATUS: Army is currently conducting negotiations for the award of a multi-year contract for the production of M40 and M42 masks. Award is scheduled for October 1996. More than one million M40 Family masks have already been fielded. Replacement of all combat vehicle crew masks with the M42A2 model has been requested but is awaiting additional funding for their procurement, previously unplanned. The M45 initial production contract is planned for award in 2QFY97. Contract awarded in November 1996.

PROJECTED ACTIVITIES: Continued production of M40 Series.

PRIME CONTRACTOR: ILC Dover (Dover, DE)
Mine Safety Appliances (Pittsburgh, PA)
TSI, Inc (St. Paul, MN)



PRODUCTION AND DEPLOYMENT

MISSION: Radiac provides individual soldiers and commanders with nuclear radiation detection equipment to allow them to fight effectively and survive on the nuclear battlefield and to minimize nuclear radiation exposure of troops during peacetime missions including peacekeeping, nuclear accident response, recovery of vehicles and equipment contaminated with depleted Uranium and maintenance of equipment containing radioactive material.

CHARACTERISTICS: The United States currently is producing and fielding nuclear detection and monitoring equipment. A family of Radiac equipment has been developed and is being fielded to U.S. forces to upgrade thirty year old technology with digital Radiac equipment that incorporates advances made in modern electronics. The AN/UDR-13 Radiac Set, is a compact, hand-held, pocket-sized tactical radiation meter. It measures and displays both gamma dose rate, and total gamma/neutron cumulative dose in a battlefield environment. The AN/VDR-2 detects, measures and displays gamma dose rate and detects and displays beta radiation. The AN/PDR-75 measures the prompt and residual gamma doses and neutron doses stored on the DT-236 Individual Dosimeter from 1-1000 cGy. The AN/PDR-77 detects and measures alpha, beta, gamma, and x-ray radiation.

FOREIGN COUNTERPART: Many nations have nuclear radiation detectors.

FOREIGN MILITARY SALES: No foreign military sales.

PROGRAM STATUS: The AN/UDR-13 was type classified standard and began production in May 1996. The AN/VDR-2 and AN/PDR-77 have completed production and are in the final stages of fielding, and the AN/PDR-75 is in its last year of production and in the final stages of fielding.

PROJECTED ACTIVITIES: Projected activities will be to complete fieldings of the Radiac equipment that are in the final stages of production and fielding and to develop the production line and initiate fielding of the AN/UDR-13 Radiac sets.

PRIME CONTRACTOR: Nuclear Research Corp (NRC) (Dover, NJ)



MISSION: The Remote Sensing Chemical Agent Detection (M21) permits early warning of chemical agent hazards through the use of remote sensing alarms.

CHARACTERISTICS: The Army and Marine Corps are currently fielding the first generation of chemical agent vapor detectors capable of sensing and warning of clouds of mustard and nerve agents up to 5 kilometers away from the detector. The M21 Remote Sensing Chemical Agent Alarm is an automatic scanning, passive infrared sensor which detects agent vapor clouds based upon changes in the background infrared spectra caused by the presence of agent vapor. The M21 is currently being fielded and mounts on a tripod. When the M93A1 FOX Nuclear, Biological, and Chemical Reconnaissance System is available, the M21 will mount on a mast on the vehicle, and its alarm system interconnected into the M93A1. It operates only in a fixed, stationary position. The Joint Service Lightweight Standoff Chemical Agent Detector (JSLSCAD) also uses infrared technology for the sensor system. However, JSLSCAD expands on this by combining emerging technologies in miniaturization and computer power to decrease the size and weight by 60%, permit 360 degree detection on the move, and operation from ground vehicle, sea and aerial platforms.

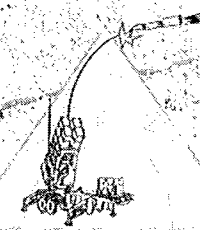
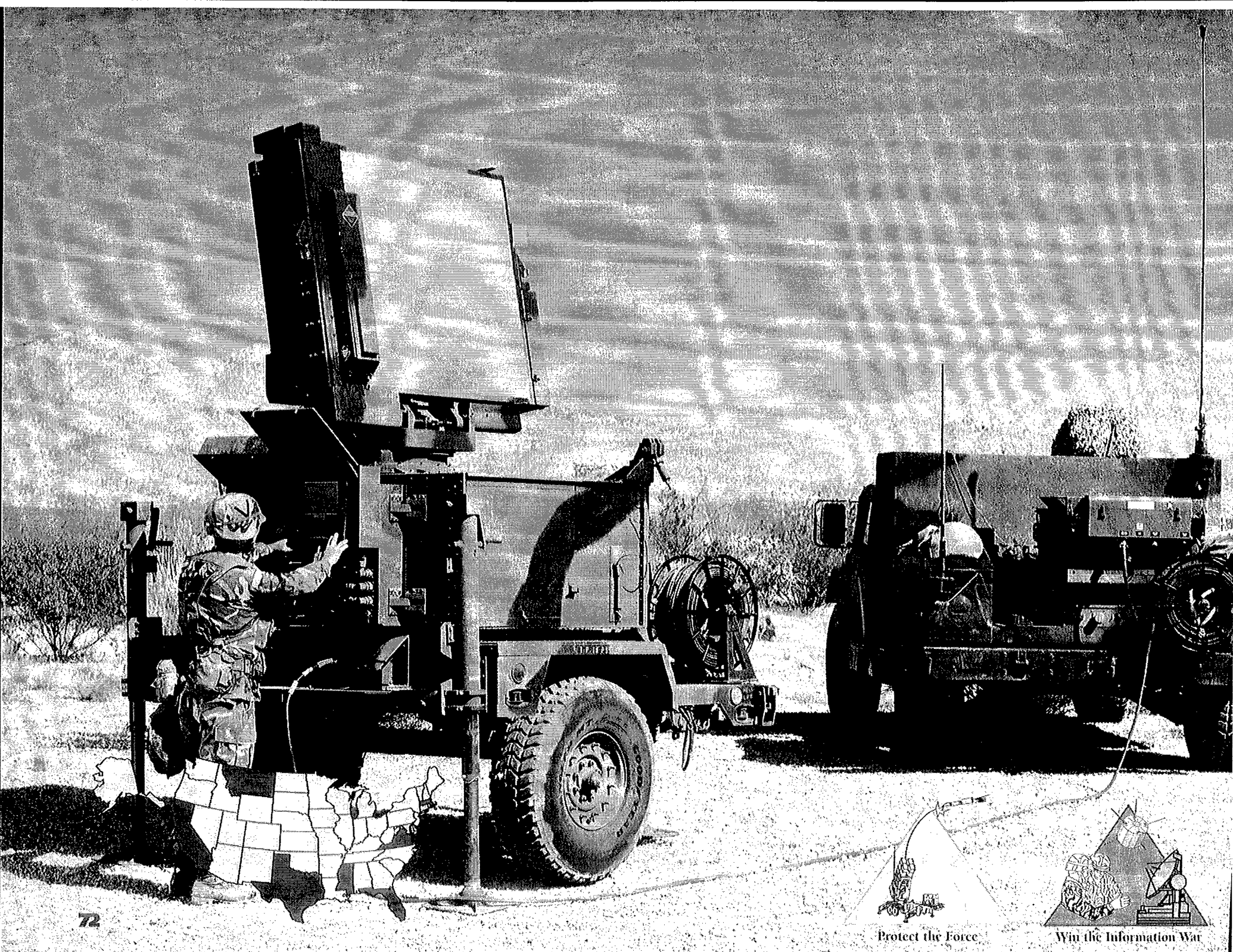
FOREIGN COUNTERPART: No known foreign counterpart.

FOREIGN MILITARY SALES: No foreign military sales.

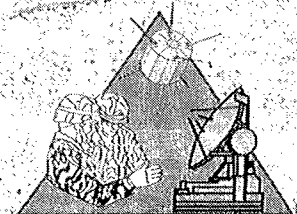
PROGRAM STATUS: Army is currently fielding the M21. The JSLSCAD is in the first year of Engineering and Manufacturing Development. It has successfully demonstrated detection of simulants from both unmanned aerial vehicles, ground vehicles and shipboard sites. Type classification is planned for FY00 with the first units to get JSLSCAD being the Marine Corps.

PROJECTED ACTIVITIES: JSLSCAD Engineering and Manufacturing Development contract award - June 1997.

PRIME CONTRACTOR: M21 production: Intellitec (FL)



Protect the Force.



Win the Information War.

MISSION: The Sentinel is used with the Army's Forward Area Air Defense (FAAD) C2 system to provide critical air surveillance of the forward areas. It automatically detects, tracks, classifies, identifies, and reports targets (cruise missiles, unmanned aerial vehicles, rotary wing and fixed wing aircraft) to Air Defense Weapons Systems located in the Forward Area.

CHARACTERISTICS: The Sentinel consists of a radar-based sensor system with its prime mover/power, Identification Friend or Foe (IFF), and FAAD Command and Control Intelligence (C2I) interfaces. The sensor is an advanced three dimensional battlefield X-band air defense phased-array radar with an instrumented range of 40 km. The Sentinel is capable of operating day or night, in adverse weather conditions, in the battlefield environments of dust, smoke, aerosols, and enemy countermeasures. It provides 360 degree azimuth coverage for acquisition and tracking. The Sentinel contributes to the digital battlefield by automatically detecting, tracking, classifying, identifying, and reporting targets (cruise missiles, unmanned aerial vehicles, rotary wing, and fixed wing aircraft). Targets can be hovering to fast moving, as well as, from nap of the earth to the maximum engagement altitude of FAAD weapons. Very accurate and quick reacting, Sentinel acquires targets sufficiently forward of the Forward Line of Own Troops (FLOT) to improve FAAD weapon reaction time and allow engagement at optimum ranges. The Sentinel integrated IFF reduces the potential for fratricide of Army Aviation and Air Force aircraft. Highly mobile and reliable, the Sentinel Anti-Radiation Missile and Electronic Counter-Measures resistant performance support Army Corps and Divisional Air Defense operations across the full spectrum of conflict. Sentinel uses a HMMWV as its prime mover. It is transportable without disassembly in USAF C-130, C-141, C-17 and C-5 aircraft and U.S. Army CH-47 helicopters. It is designed to be transported as external cargo (sling load) by U.S. Army UH-60 aircraft. The Sentinel is capable of being march-ordered and emplaced by two soldiers. The system is capable of normal operation while attended by one soldier and will not require continuous operator attention to perform normal operations.

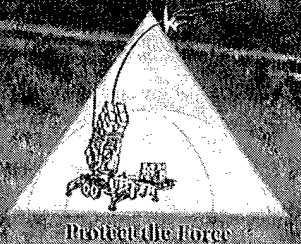
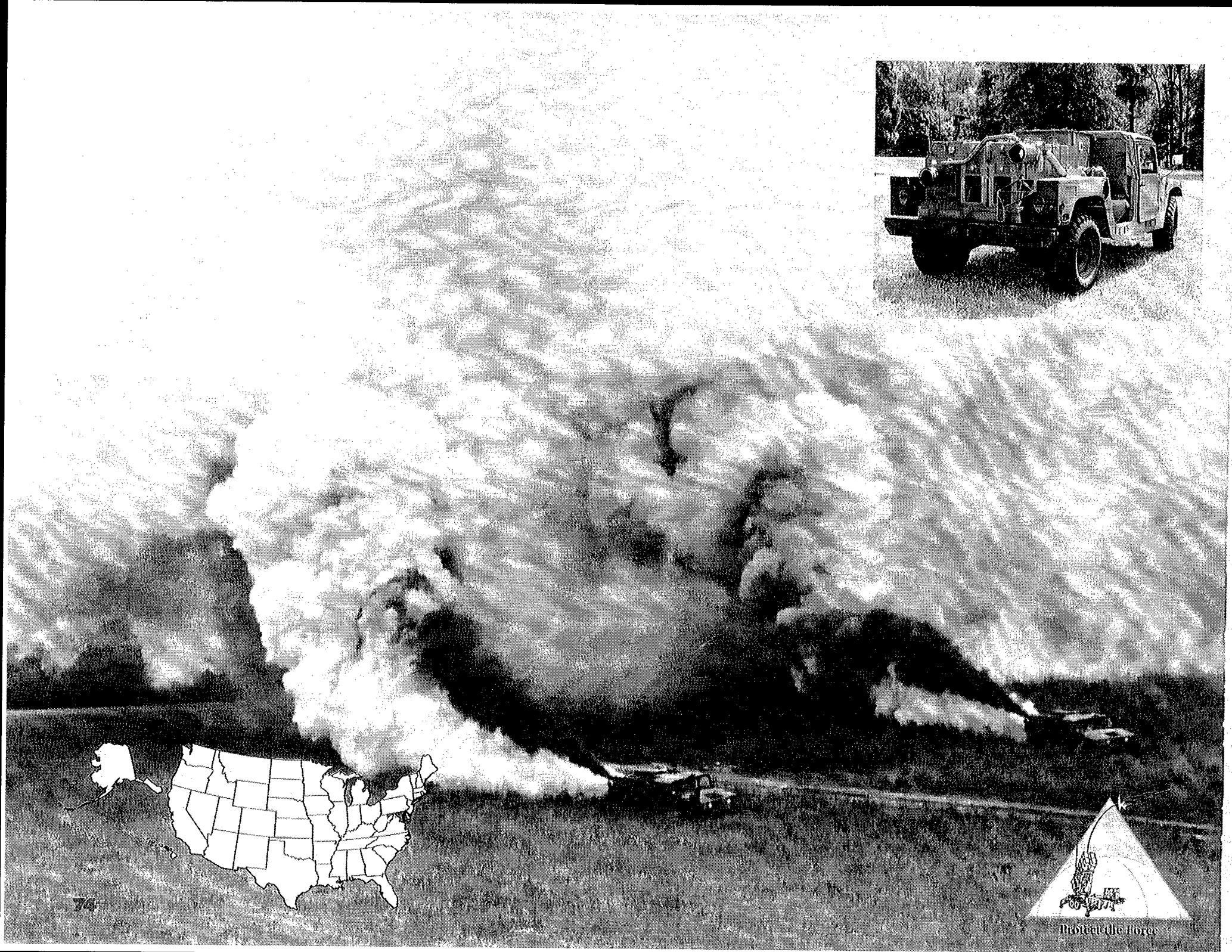
FOREIGN COUNTERPART: Seven other foreign air defense radars which specialize in search and track of low and slow airborne targets are: Contraves LPD-20 (Italy); Skyguard-Improved (Switzerland); Hot Shot 2S6 (Russia); El Dorado (France); Siemens DR-641 (Germany); Rodeo (France) and RA-20S (France).

FOREIGN MILITARY SALES: Turkey

PROGRAM STATUS: Sentinel is in the Production and Deployment phase. The contract was awarded in 2QFY92. First production delivery was received on 2 July 1996.

PROJECTED ACTIVITIES Second Production Option Award FY97.
Production Verification Test (PVT) FY97.
Production Fielding to 4ID (1-44) FY97.

PRIME CONTRACTOR: General Motors (Hughes Aircraft Company) (El Segundo, California and Forest, Mississippi)



PRODUCTION AND DEPLOYMENT

Smoke Generator (M56)

MISSION: The mechanical smoke generator (M56) provides large-area obscuration in the visual and infrared spectra.

CHARACTERISTICS: The M56 is a large-area smoke generator system that is mounted on the High Mobility Multipurpose Wheeled Vehicle. The M56 will obscure high-priority targets, such as airfields, bridges, and ammunition depots, as well as convoys and troop movements. The system is modular and uses a gas turbine engine as a power source to disseminate obscurants. The visual screening module is capable of vaporizing fog oil at a rate equal to the M157 smoke generator for up to 60 minutes. The infrared screening modules is capable of disseminating a particulate material to provide 30 minutes of screening.

Gas turbine engine-powered
visual screening (fog oil): 1.33 gal/min
1 hr continuous

Infrared screening (graphite): 10 lb/min
30 min continuous

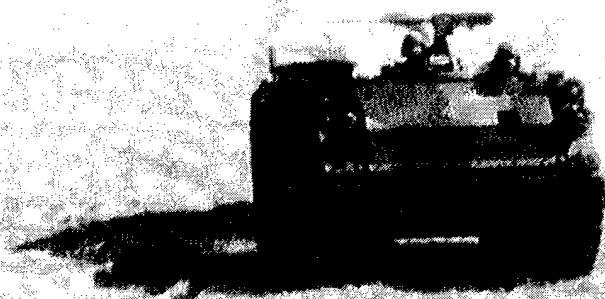
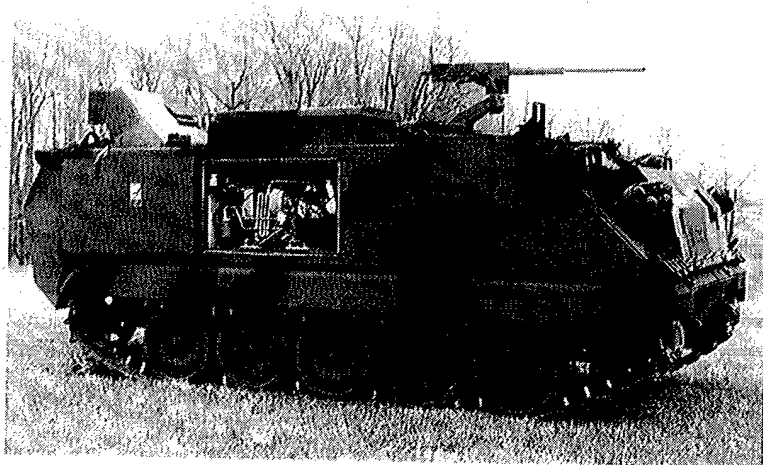
FOREIGN COUNTERPART: Countries using Soviet doctrine emphasize extensive use of smoke during tactical exercises. Many nations, especially those in the Middle East, are beginning to realize the benefits of smoke and have developed programs in this area.

FOREIGN MILITARY SALES: No foreign military sales.

PROGRAM STATUS: The M56 Smoke Generator was type classified standard in September 1994. A production contract was awarded in March 1995. Fielding will begin in FY97.

PROJECTED ACTIVITIES: The First Unit Equipped (FUE) will be in March 1997.

PRIME CONTRACTOR: Robotic Systems Technology (Westminster, MD)



EMD

MISSION: The mechanical smoke generator (M58) system enhances the maneuver commander's ability to deploy his forces. Six vehicles are organized into two squads, led by the platoon leader in one of the six vehicles. The M58 smoke platoon is task organized to the brigade or divisional commander, who will use them to conceal ground maneuver forces, breaching, river crossing, and recovery operations. Three platoons are assigned to the Mechanized Smoke Company and one platoon to the Divisional Chemical Company.

CHARACTERISTICS: The M58 consists of a mechanized smoke generator system mounted in a modified M113A3 Armored Personnel Carrier. The carrier incorporates the Reliability Improvement of Selected Equipment configuration that includes an upgraded engine and transmission, external fuel tanks, and new driver's station. The 250 hp Detroit Diesel powerpack provides a 20.3 hp/ton ratio at a combat loaded weight of 27,000 pounds. This is sufficient to maintain mobility with the M1 and M2/M3 vehicles the M58 supports. The smoke generator system provides up to 90 minutes of visual and 30 minutes of infrared obscuring screens. A 30-minute millimeter wave obscuring capability will be added as a product improvement. The system includes the Driver's Thermal Viewer that allows it to see through its own smoke clouds and a Gas Particle Filter Unit for operating in an NBC-contaminated environment. A crew of three will operate the M58 system.

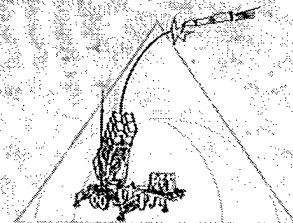
FOREIGN COUNTERPART: Countries using Soviet doctrine emphasize extensive use of smoke during tactical exercises. Many nations, especially those in the Middle East, are beginning to realize the benefits of smoke and have developed programs in this area.

FOREIGN MILITARY SALES: No foreign military sales.

PROGRAM STATUS: The M58 program entered the production deployment in FY96.

PROJECTED ACTIVITIES: Production is scheduled for FY96-99, with production verification testing scheduled 2QFY97 and fielding through FY97-00.

PRIME CONTRACTOR: Anniston Army Depot (Anniston, AL)
Robotic Systems Technology (Westminster, MD)



Protect the Force

PRODUCTION AND DEPLOYMENT

MISSION: The soldier system's mission is to provide the soldier with everything he wears, carries, and consumes in combat.

CHARACTERISTICS: The soldier system includes improved individual equipment, weapons, clothing, C4I, and subsistence items, to enhance his overall effectiveness and survivability on the battlefield. Soldier system items include several related programs that respond to changing threat requirements and advances in state-of-the-art technology.

Soldier Modernization provides a cohesive plan for the coordinated development of soldier system items and is the roadmap for near-term, mid-term, and far-term efforts. In the near term, one key element of the soldier support and modernization process is the Soldier Enhancement Program (SEP). SEP projects are primarily modified non-developmental items and are focused in four general areas: weapons and munitions, combat clothing and individual equipment (CIE), communications and navigation aids, and food/water and shelter. SEP projects include Shin/Knee Guards for Riot Control; Pistol Belt Extender; Extreme Cold Weather Boot; Ballistic/non-Ballistic Face and Body Shield; Fuel Bar; improved Physical Fitness Uniform; Small Unit Showers; Lightweight Video Reconnaissance System; Individual Soldier Radio; Heavy Sniper Weapon System; M4 Improved Butt Stock; Non-lethal 40 mm, 5.56 mm, and 12 Gauge Munitions; selectable Lightweight Attack Munitions and Armor Crew/infantry Protective Mask XM45 to name a few. Mid-term research and development CIE efforts are focused on the design of lighter-weight equipment, ballistic and laser eye protection, and improved chemical protective clothing that takes advantage of the latest technology and advanced materials. These efforts concentrate on Self-Contained Toxic Environmental Protective Outfit (STEPO), Joint Service Lightweight Integrated Chemical Suit Technology (JSLIST), and improved laser eye protection. Other key elements include the Land Warrior (LW), Air Warrior (AW), and Mounted Warrior (MW) systems. LW is a first generation integrated fighting system for dismounted combat soldiers. It enhances soldiers' battlefield capabilities through the development and integration of Army components and technologies into a cohesive, timely, and cost-effective system. LW subsystems include an individual soldier radio/computer, with embedded global positioning system (GPS), and communications system; enhancements to CIE; integrated headgear with heads-up display and image intensifier; improved chemical/biological mask; and modular weapon system with thermal sight, infrared laser aiming light, and laser rangefinder/digital compass. Far-term efforts include the Force XXI Land Warrior, Objective Individual Combat Weapon (OICW) and other programs which pursue advance technology at the component level for insertion into Land Warrior. Emphasis will be on those areas that provide substantial operational benefits such as OICW or enhanced radio/GPS or integration of components to achieve weight savings for the soldier. Similar efforts have been started for mounted and air crew personnel. AW and MW efforts are being defined.

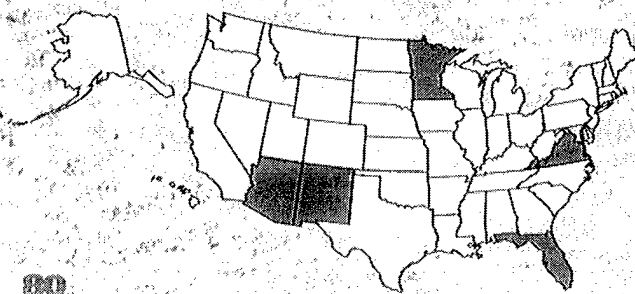
PROGRAM STATUS: There are approximately 100-125 projects per year in various stages of R&D for the Soldier System (CIE/SEP/Land Warrior). Land Warrior (LW), an Army Acquisition Category III program, awarded an R&D contract to Hughes Aircraft Co. on 11 July 1995. Mounted Warrior MNS was approved 10 April 1995. Air Warrior MNS was approved 17 July 1995.

PROJECTED ACTIVITIES: It is projected CIE/SEP, will have over twenty new starts in FY 97 and as many as 24 new items will be proposed for adoption in FY 97. Land Warrior is scheduled for Early Operational Evaluation in the first quarter of FY 97. Mounted Warrior is currently funded in the POM starting in FY 98.

PRIME CONTRACTOR: Aimpoint Inc. (Herndon, VA)
Hughes (El Segundo, CA)
SARCO (Sterling, NJ)

Alliant Tech Systems (Hopkins, MN)
Motorola (Scottsdale, AZ)
Texas Instruments (San Antonio, TX)

DECILOG (Melville, NY)
Olin (East Alton, IL)



SCIENCE AND TECHNOLOGY	CONCEPT	DEM/VAL	EMD	PRODUCTION AND DEPLOYMENT	OPERATIONS AND SUPPORT
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MISSION: Stinger is the short-range air defense missile for combat units (Brigade, Division, and Corps Area) against cruise missiles, unmanned aerial vehicles (UAVs), low flying fixed wing aircraft and helicopters.

CHARACTERISTICS: Stinger is a fire-and-forget infrared missile system which can be fired from a number of ground-to-air and rotary wing platforms. This missile homes in on the heat emitted by either jet or propeller-driven, fixed wing aircraft or helicopters. The Stinger system employs a proportional navigation system that allows it to fly an intercept course to the target. Once the missile has traveled a safe distance from the gunner, its main engine ignites and propels it to the target. The Stinger program has evolved from the redeye, to Stinger Basic, followed by Stinger Post, then Stinger Reprogrammable Microprocessor (Stinger RMP), and finally an upgrade to Stinger Block I. To overcome targets in clutter, funds have been provided in FY95-97 to develop the Stinger Block II. The Stinger Block II focal plane array lens has been demonstrated and is capable of acquiring and tracking targets in clutter at 2.5 times or greater than the acquisition range of the Stinger Block I. Stinger has been fielded on MANPADS, Avenger, Kiowa Warrior, Bradley Linebacker and LAV-AD.

Guidance: Passive infrared and ultraviolet homing

Speed: Supersonic

Navigation: Proportional with lead bias

Weight: 34.5 lb

Diameter: 2.75 in

Length: 60 in

FOREIGN COUNTERPART: Britain: Blowpipe, Javelin Russia: SA-7, SA-14, and SA-16
Sweden: RBS-70

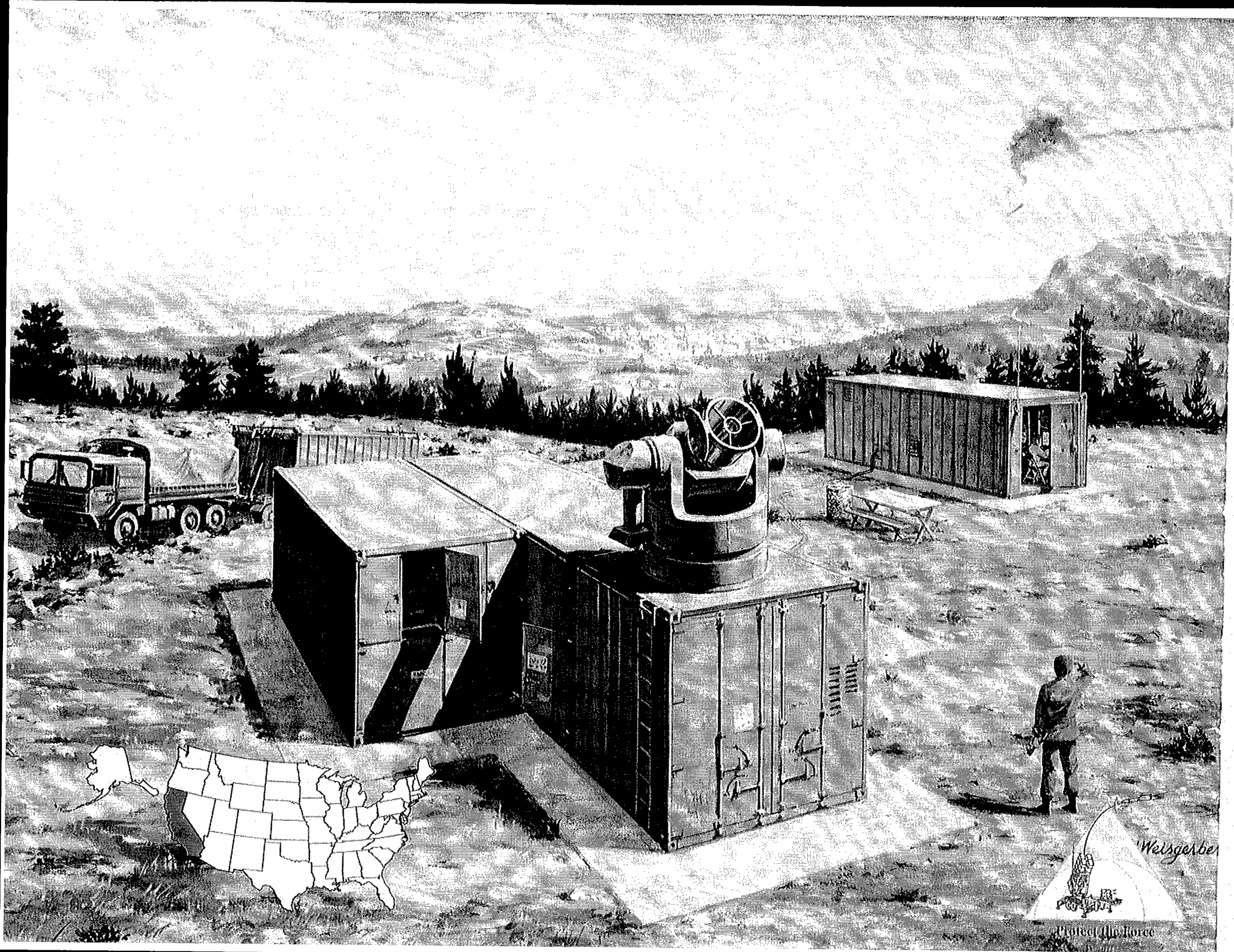
FOREIGN MILITARY SALES: Germany, Denmark, Korea, Netherlands, Switzerland and Taiwan.

PROGRAM STATUS: Stinger-RMP is currently being upgraded to Stinger Block I. The first Stinger Block I was fielded in November 1995. Stinger-RMP was fielded in FY90. Stinger-RMP production was accelerated to meet Desert Shield/Storm requirements. Further improvements to Stinger-RMP performance have been developed under a Block I product improvement program which started in FY94 with fielding in FY96. The Army has initiated the Block I Stinger improvement program to extend the service life and develop improvements to increase accuracy and resistance to countermeasures, effectiveness against near-term, low-observable targets (UAVs and cruise missiles) and standoff helicopters in clutter, and to eliminate the need for super-elevation (a safety hazard when Stinger is fired from a hovering helicopter). The objective Stinger missile is the Stinger Block II with the focal plane array seeker for acquiring, tracking and hitting aerial targets at the kinematic range of the missile. The Army has funded for approximately 11,500 Stinger Block I retrofits.

PROJECTED ACTIVITIES: From the good results obtained in the FY95 tech base effort, the Army plans to continue with a four year FY96-99 Stinger Block 2 focal plane array seeker Demonstration/Validation (DEM/VAL) phase prior to the Engineering and Manufacturing Development (EMD) phase. The Stinger Block II DEM/VAL phase reduces the risk on the EMD phase by proving-out the new seeker technology.

PRIME CONTRACTOR: General Motors (Hughes Aircraft Company) (Tucson, AZ; Pomona, CA; Farmington, NM)

* See appendix for list of subcontractors.



SCIENCE AND TECHNOLOGY

MISSION: The overarching objective of the Tactical High Energy Laser (THEL) Advanced Concept Technology Demonstration (ACTD) is to evaluate the effectiveness of a THEL in negating the threat posed by Katyusha and other short-range artillery rockets. The THEL ACTD Demonstrator mission provides for early operational assessment of the acquisition and close-in engagement problems associated with the evolving air threat of short to medium range targets within the Air Defense Architectures, which will significantly enhance the defensive coverage to combat forces and theater level assets.

CHARACTERISTICS: The THEL ACTD demonstrator will be a deuterium fluoride chemical laser with a minimum of 60 seconds of continuous total run time. The Pointer Tracker/Beam Control system will be capable of providing + 200 degree coverage in azimuth and -5 to 95 degrees coverage in elevation, and have the ability to accept cueing from external sensors in existing air defense architectures. The demonstrator, including the laser device, pointer tracker, support equipment, and command, control, communication, and intelligence subsystems, will consist of modules enclosed in standard shipping containers that are road transportable and air transportable. The THEL demonstrator will also be configured for field setup and testing at the High Energy Laser Systems Test Facility and remote locations in Israel, and demonstrate equivalent system performance to ACTD phase one criteria at Capistrano Test Site (CTS), Capistrano, CA.

FOREIGN COUNTERPART: No known foreign counterpart.

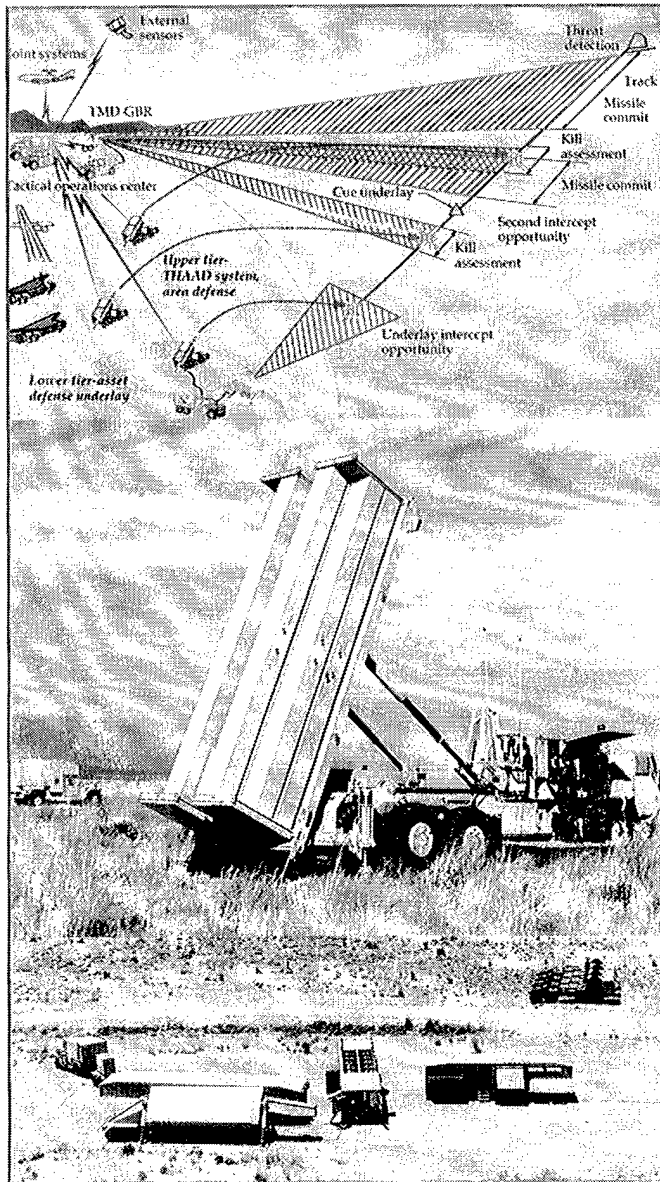
FOREIGN MILITARY SALES: No foreign military sales.

PROGRAM STATUS: On 29 April 1996, then Prime Minister of Israel, Shimon Peres, met with President Clinton and Secretary of Defense Perry. During the meeting, the U.S. made a commitment to assist Israel in the development of a THEL demonstrator for the ultimate purpose of defeating the threat posed by Katyusha and other short range rockets against the cities in northern Israel. By memorandum dated 11 May 1996, Secretary of Defense Perry established the THEL ACTD program. The Secretary of Defense established the end of 1997 as the completion date for the THEL ACTD. The Department of Defense and the Israeli Ministry of Defense executed a Memorandum of Agreement on 18 July 1996 which delineates the THEL program. The MOA provides for performance of the ACTD, in principle, during calendar years 1996-1997. On 12 Sept 1996 a memorandum was generated by Assistant Secretary of the Army, Gilbert F. Decker to the Deputy Under Secretary of Defense recommending the completion date of 31 Mar 1998 for the THEL ACTD Program. On 22-24 July 1996 the Concept Design Review was held establishing requirements for the follow on Detailed Engineering Design Review. The THEL Project Management Office has been established and is assigned to the Space and Strategic Defense Command.

PROJECTED ACTIVITIES:

- Manufacturing Readiness Reviews, 1QFY97-2QFY97.
- THEL ACTD Systems Integration Testing at CTS, Jan 1998 - Mar 1998.

PRIME CONTRACTOR: TRW currently under letter contract.



MISSION: The Theater High Altitude Area Defense (THAAD) system will fill the void of a large area defense of tactical ballistic missile threats, including weapons of mass destruction, operating in the endo- and exo-atmosphere and directed against military forces and strategic geopolitical assets.

CHARACTERISTICS: The THAAD system is a Theater Missile Defense (TMD) weapon system designed to intercept short- and intermediate-range missile threats that will employ increasingly sophisticated warhead technologies. The THAAD system will augment existing and other planned TMD capabilities by engaging threat missiles at higher altitudes and at longer ranges. This intercept capability negates the threat use of weapons of mass destruction. THAAD's hit-to-kill guidance approach provides a high degree of lethality compared to existing systems with fragmentation warheads.

The THAAD system consists of missiles, launchers, Battle Management/Command, Control, Communication, Computers, and Intelligence (BM/C4I) elements, radars, and support equipment. The missile is a hypervelocity, single stage, solid propellant booster and a unique endo-/exo-atmospheric kill vehicle (KV). The hit-to-kill technology KV, designed to destroy threat warheads, guides to target using an infrared homing seeker. The launcher utilizes the Army standard Palletized Loading System (PLS) 16-ton truck with a capacity of at least 8 missile rounds on a missile pack. The HMMWV based BM/C4I centers are a set of highly robust and configurable shelters to ensure maximum flexibility on the modern battlefield. These units interface and coordinate with the Theater Air Defense C2 system and will control both the Engagement and Force Operations for the THAAD system. The BM/C4I will provide automated acquisition and identification of TBM threats, process and disseminate track data, assign weapons, monitor engagements, and guide sensor operations. The THAAD X-band phased array radar acquires the target at long ranges, tracks the target and provides in-flight updates to the THAAD interceptor prior to intercept. The radar also performs kill assessment to support the decision to commit additional interceptors or to cue lower tier systems such as the Patriot System. The THAAD System will support passive defense and attack operations by providing impact point predictions and launch point estimations. The THAAD system will be fully transportable by C141/C5/C17 military aircraft. Once in theater, the system will utilize Army standard movers to be highly mobile on highways and unimproved roads. These system capabilities will allow THAAD to be rapidly deployed to any theater on short notice. Current plans call for a User Operational Evaluation System to be available in 1998 to gain user input into the final system design and to provide a Commander In Chief with a prototype system to use in the case of an emergency.

FOREIGN COUNTERPART:

France and Italy:
Germany:

THAAD System

SAAM; SAMP/N; SAMP/T
MSAM

THAAD Radar

Russia: Hen House; Dog House; and Try Adds radars

FOREIGN MILITARY SALES:

No foreign military sales.

PROGRAM STATUS:

The THAAD program is currently in the Demonstration and Validation (DEM/VAL) phase. The contract for DEM/VAL was awarded on 4 September 1992. Flight testing began in April 1995. Completion and delivery of a User Operational Evaluation System (UOES) prototype is scheduled for availability in FY98 and final delivery in FY99.

PROJECTED ACTIVITIES:

DEM/VAL flight tests will provide interceptor and system data to support the exercise of the UOES option and the Milestone II decision in FY98.

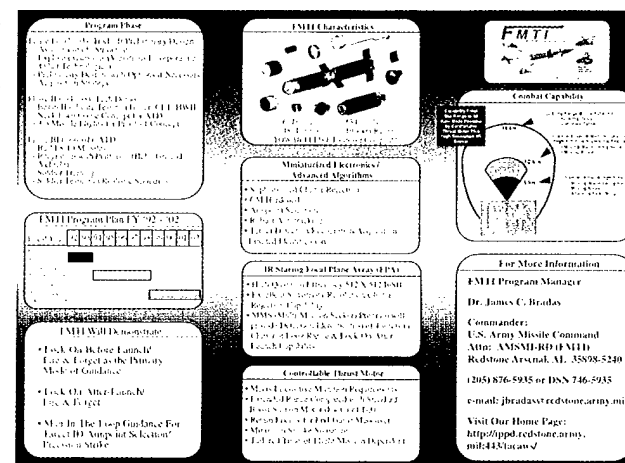
PRIME CONTRACTOR:

THAAD System: Lockheed Martin (Lockheed Martin Missiles and Space Co.) (Sunnyvale, CA)
THAAD Radar: Raytheon (Bedford, MA) (as of FY97 Raytheon will be a prime sub to Lockheed Martin)

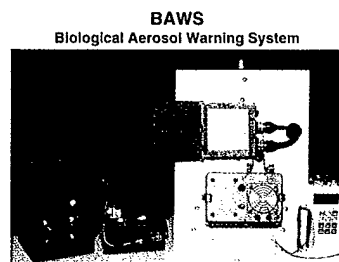
Future Missile Technology Integration (FMTI) (1994-1998)

FMTI will demonstrate lightweight, multirole missile technology in support of ground-to-ground, ground-to-air, air-to-air, and air-to-ground missions with an emphasis on ground-to-ground technology with a multimission growth potential. The missile system demonstration includes the integration of guidance, control, propulsion, airframe and warhead technologies capable of performing in high clutter/obscurants, and adverse weather and countermeasure conditions. Missile control and guidance system technology will explore capabilities such as lock-on-before/lock-on-after launch, fire-and-forget, guidance, signal and image processing, and wideband secure radio frequency data links.

FMTI has five primary goals: superior antiarmor fire-and-forget lethality in clutter up to five kilometers; the ability to engage armored vehicles and suppressed helicopters in clutter at extended ranges; multirole capability including ground-to-ground, ground-to-air, air-to-air, and air-to-ground; multiplatform launch capability from the HMMWV, Bradley fighting vehicle, Avenger, RAH-66 Comanche, AH-64 Apache, OH-58D Kiowa Warrior, light armored vehicle and AH-1W Cobra; and TOW and Hellfire launcher compatible. The program is structured in three phases: Phase I, concept evaluation, fiscal 1992-1993 (that is, design, simulation); Phase II, technology demonstration, fiscal 1994-1997 (that is, five missiles fabrication, tower and captive flight test); and Phase III, proposed advanced technology demonstration (ATD), fiscal 1999-2002 (that is, platform integration, flight and ground testing). Supports: TOW follow-on



Integrated Biodetection Advanced Technology Demonstration (ATD) (1996-1999)

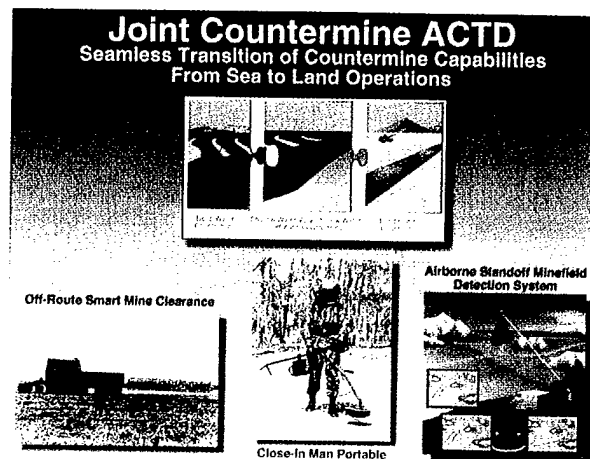


This ATD will demonstrate point detection and remote early warning of biological agents. The ATD will focus on point biosensors that will incorporate automated DNA technology to increase reliability, stability, sensitivity and response time. This ATD will also demonstrate a remote biological aerosol warning capability using small, micro-ultraviolet laser-based, fluorescent particle counters. The key to the ATD is to demonstrate the technologies in a unified effort in a battlefield exercise providing detection and warning of biological agents before forces are affected, thus reducing casualties.

Joint Combat Identification Advanced Concept Technology Demonstration (ACTD) (1996-1999)

This ACTD is aimed at solving the combat identification problem underscored by the lessons learned from Operation Desert Storm. The effort will build upon the Battlefield Combat Identification System (BCIS), which is a millimeter wave question and answer, target ID system developed for ground vehicle platforms. The ACTD will validate the architecture for, and demonstrate an affordable, integrated ground-to-ground and air-to-ground combat ID capability. An enhanced version of BCIS with digital data link for improved situation awareness and various air-to-ground concepts including direct sensing target ID, "don't shoot me" communications nets and situation awareness through the commander's and gunner's sight will be demonstrated in the Force XXI exercise and the All Service Combat Identification Evaluation Test field exercise in FY 97. Concepts will be evaluated for lightweight combat identification for the dismounted soldier within battlelab warfighting experiments in FY 97.

**Joint Countermine
Advanced Concept Technology
Demonstration (ACTD)**

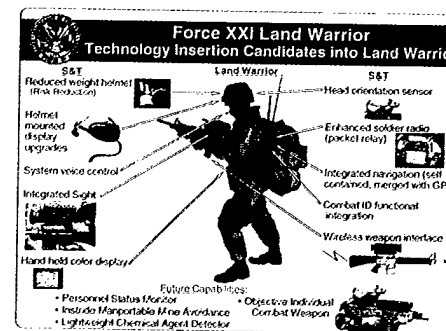


The Joint Countermine (JCM) ACTD will demonstrate seamless MCM operations by integrating Army, Navy, and Marine Corps technology developments and fielded military equipment. This ACTD will employ eleven (11) prototypes from Advanced Technology Demonstrations and preproduction phases of the development cycle along with fielded equipment in live demonstrations. In addition, a robust modeling and simulation effort, Joint Countermine Operational Simulation (JCOS), will expand the information the information base obtained from the live demonstrations through constructive modeling and distributed interactive simulation. C4I connectivity and notional architectures for MCM operations will also be an integral part of the JCM ACTD. The ACTD will be completed in two live demonstrations. Demonstration I is focused on land combat countermining and is scheduled to be conducted in 4QFY97. Demonstration II focuses

on deep and shallow water countermining and will be completed in 2QFY98.

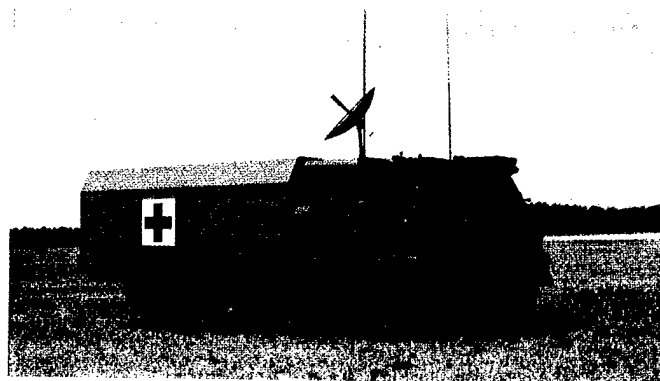
**Force XXI Land Warrior
(1996-FY00)**

The Force XXI Land Warrior program is the Land Warrior (LW) Science and Technology (S&T) program which addresses the critical Army need to enhance the performance, lethality, survivability, and sustainment of the individual soldier. Force XXI Land Warrior efforts focus on technology insertions to the LW backbone which will enhance the LW system or provide improved capabilities. This program will be utilized to further reduce the LW fielding risks and to insure that future LW procurements are upgraded with current technological advancements. This program leverages the commercial microelectronics and telecommunications industries to achieve lightweight, miniaturized components. Supports: Land Warrior and U.S. Marine Corps.



**Medical Research and
Development**

1. Advanced Technology. The Commander, U.S. Army Medical Research and Materiel Command (USAMRMC), is the Army Medical Commands chief technology officer. He is responsible for enhancing battlefield medical care by adapting new technologies that will significantly reduce deaths on the battlefield through the projection of life-saving medical expertise to the front lines. These technologies will enhance the delivery of care at each echelon of the field medical care system by providing vastly enhanced communication links for diagnostic consultation between deployed physicians and specialty experts in the United States.



The USAMRMC's Medical Advanced Technology Management Office (MATMO) has coordinated deployments of telemedicine technology in support of US forces in Macedonia, Croatia and Haiti. This technology has been incorporated into Advanced Warfighter Experiment (AWE) Demonstrations of the Army's digitized battlefield for the 21st century. Advances in Army medicine have thus been fully integrated into the broader Army vision of a digital future.

2. Infectious Diseases. The first vaccine for hepatitis A was recently licensed by the U.S. Food and Drug Administration. Medical researchers assigned to the U.S. Army Medical Research and Materiel Command's Walter Reed Army Institute of Research conducted the large-scale clinical trials that made licensure possible. Army participation in the lengthy process of approving the new vaccine helps to insure the availability of the promising new product for future soldiers deploying to areas of the world in which hepatitis A is an endemic disease threat.

Researchers at the U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID) at Fort Detrick, MD, while continuing to develop improved medical countermeasures to classical biological warfare agents, have increased their efforts in global surveillance of new and emerging infectious diseases. Recent outbreaks of Hanta virus in the United States and Ebola virus in Zaire have served to remind military and civilian medical communities of the importance of disease surveillance. USAMRIID scientists collaborate on a continuing basis with colleagues at the World Health Organization, the U.S. Centers for Disease Control and Prevention, and other agencies in monitoring emerging threats. USAMRIID is also involved in basic research efforts to develop preventative products to protect military personnel from these new threats.

3. Combat Casualty Care. Pilot lot production of purified hemoglobin for blood substitute research has resumed at the Walter Reed Army Institute of Research. The production facility was temporarily mothballed during the relocation of the blood research program from the Letterman Army Institute of Research. Research also continues on cell cultures in microgravity, using the Space Shuttle as a platform. These studies hold promise for future advances in wound healing.

Both the Combat Casualty Care Research Program and the Operational Medicine Research Programs have established closer ties to the Soldier Systems Command, outlining medical interfaces with and medical components of the 21st Century Land Warrior.

4. Persian Gulf Illness. The USAMRMC is investigating possible causes of Persian Gulf-related illnesses on several fronts. The USAMRMC supported a toxicological study of three chemicals used in protective products during the Gulf War. Deet, the active ingredient in the Army's insect repellent; permethrin, a pesticide applied to military uniforms which supplements the repellent formulation applied to the skin; and pyridostigmine bromide, a drug used as a pretreatment for protection from chemical warfare agents, were studied in the test. The purpose of the toxicological study was to assess the toxicity of the three chemicals individually, and in combination. The study establishes that there is some synergy, or enhanced toxicity of the products when combined, but at exposure levels far above those resulting from normal, recommended use.

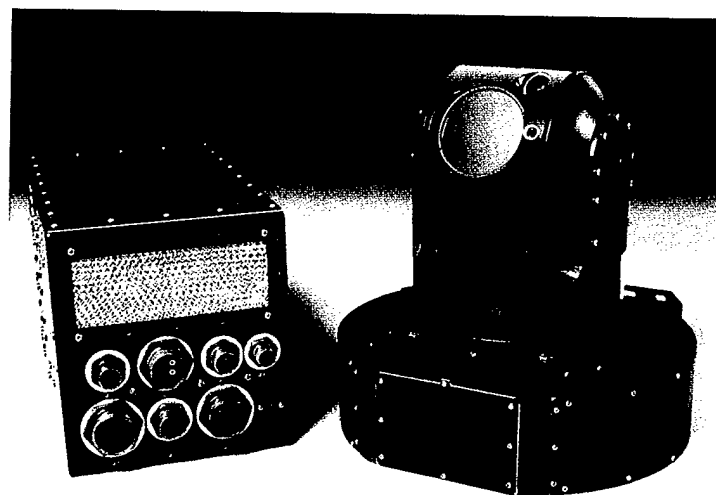
The USAMRMC has published requests for proposals for research on Persian Gulf illnesses, as a result of a Congressional appropriation of \$5 million for research on these illnesses. The USAMRMC is managing the research, which will be conducted by non-federal agencies. Proposals will be peer-reviewed by expert panels, and research grants will be awarded based on the merits of the proposals.

5. Special Interest Programs. The USAMRMC continues to manage Congressionally-mandated research programs in breast cancer and women's health. The Breast Cancer Research Program awarded approximately 750 grants and contracts with FY 1993, FY 1994, and FY 1995 funds. Proposals are now being evaluated for additional research to be supported by a fourth appropriation for breast cancer research from the 1996 budget.

The Defense Women's Health Research Program investigates health problems commonly encountered by military women. Appropriations of \$40 million from the FY 94 and 95 budgets are supporting a variety of in-house military and contractor research efforts. This program is consistent with a trend in civilian medical research to balance the traditional focus of medical research on male subjects by directing more research at women and women's health issues.

Mine Hunter/Killer Advanced Technology Demonstration (ATD) (98-01) The Mine Hunter/Killer will demonstrate a conceptual vehicular mounted system to autonomously detect, locate, and neutralize land mines at tactical maneuver speeds. The technologies will be adaptable to light vehicle platforms (HMMWV) and medium or heavy armored vehicles to support combat maneuver and rear area logistics/operations other than war missions. The system will automatically detect, classify, and geolocate metallic and non-metallic mines. The position/location information will be used to direct a neutralizer to the individual mine. This classification and location data will also be communicated to other tactical units. Standoff detection sensors that will be demonstrated include infrared (IR) and forward looking radar. Standoff neutralization devices to be evaluated are kinetic energy projectiles, shaped charge explosives, and emerging directed energy beams. Supports: Joint Countermine ACTD, Ground Stand-off Mine Detection System, Breacher P3I

Multispectral Countermeasures Advanced Technology Demonstration (ATD) (97-00) The Multispectral Countermeasures ATD will demonstrate advancements in laser technology, energy transmission, and jamming techniques for an all laser solution to infrared countermeasures and provide the technology baseline for product improvements to the Advanced Threat Infrared Countermeasure/Common Missile Warning System (ATIRCM/CMWS). These technologies will provide the capability to counter both present and future imaging focal plane array and non-imaging missile seekers. A tunable multiline laser with a fiber optic transmission line, advanced jamming algorithms will be live fire tested using the ATIRCM as a testbed. The goal is a 3X reduction in laser jam head volume, a 35 pound weight reduction, a 2X reduction in ATIRCM/CMWS power consumption, and a 4X increase in jammer power. Supports: Tri-Service ATIRCM/CMWS



Nuclear, Biological, Chemical (NBC) Defense Science and Technology Program The NBC defense science and technology program includes technologies for individual physical and medical protection, collective protection, decontamination and contamination avoidance. Individual protective technologies will offer increased respiratory protection against current and emerging NBC threats while providing improved weapons systems and minimizing the physiological burden imposed by NBC protective equipment. Individual protective equipment also includes advanced materials for clothing which will provide enhanced protection and reduced heat stress. Medical chemical-biological defenses will provide new pretreatments for nerve agents, topical skin protectants for vesicants, new vaccines for biological threats, and novel therapies for chemical and biological threats.

Improved casualty care practices doctrine will increase the return-to-duty rate, thus adding to force sustainment. Collective protection technologies will investigate continuous, regenerable filtration requiring minimal logistics. New decontamination technologies will minimize logistics burden, reduce contamination impact on mission effectiveness and have low environmental impact. The emphasis on the contamination avoidance component of NBC defense includes technologies for multiagent sensor, point detection and remote early warning for real-time detection and identification of chemical and biological agents. In addition, detectors will be more compact, so they may be placed on a variety of platforms and will not have large space and power requirements.